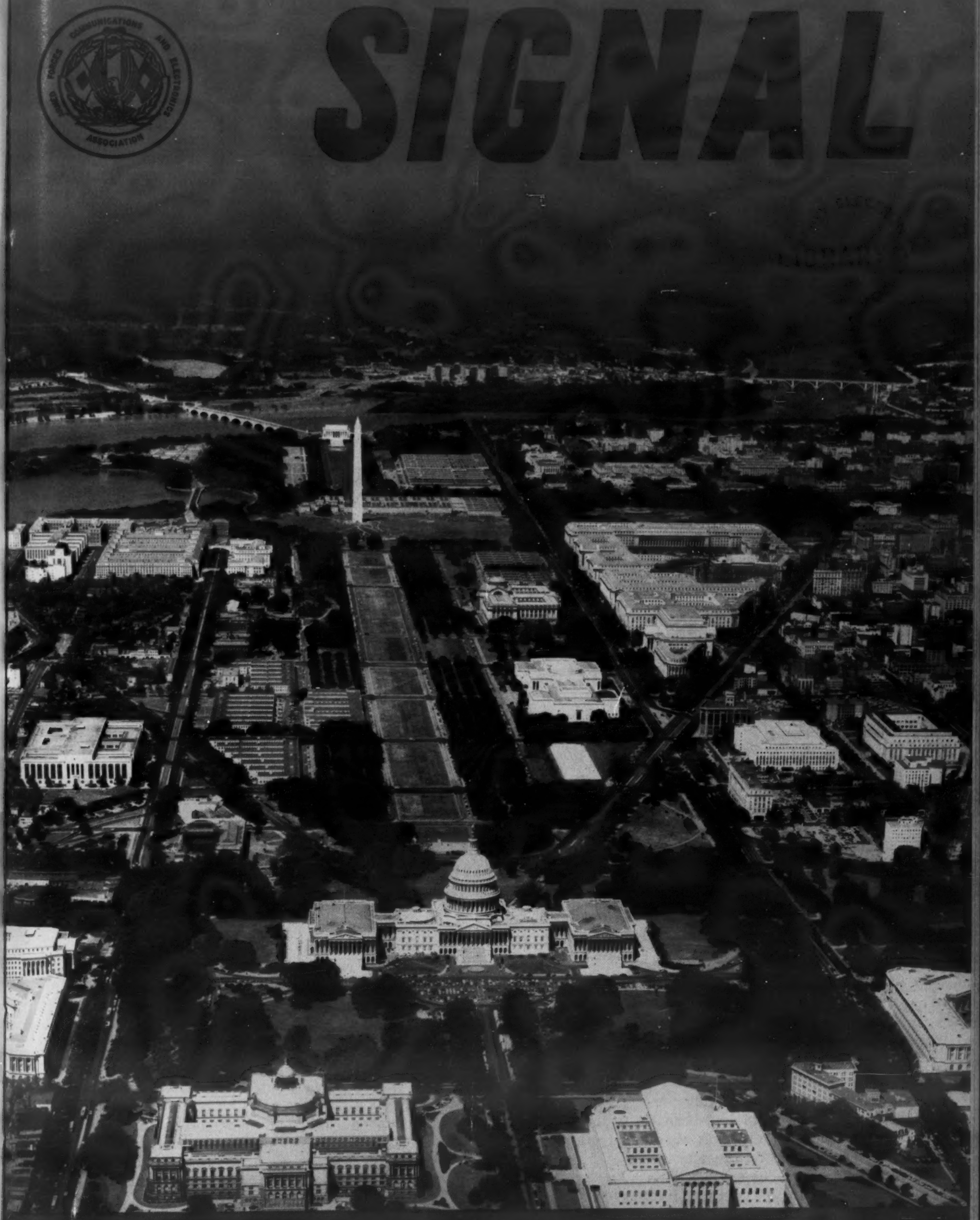
MAY 8 1957

April 1957

Communications—Electronics—Photography

SIGNAL



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BPA

SIGNAL

Communications-Electronics-Photography

Journal of the Armed Forces Communications and Electronics Association

VOLUME XI APRIL 1957 NUMBER 8

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Aerial photo — Washington, D. C.

This aerial view, taken by Fairchild Aerial Survey, Inc., highlights many of the points of interest of the 1957 AFCEA Convention City.

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More News About the AFCEA Convention

Tour of Naval Research Laboratory — On Tuesday, May 21, members and their guests are invited to the Naval Research Laboratory for lunch, followed by a tour of the Laboratory's new nuclear research reactor facility and demonstrations of some current work in the general field of electronics. The reactor is the first in the Nation's Capitol and the first research reactor to be designed, built, and operated by a Department of Defense laboratory.

You have read about some of NRL's accomplishments in SIGNAL; this is your chance to see the laboratory in operation.

Watch for complete convention coverage in the May issue of SIGNAL

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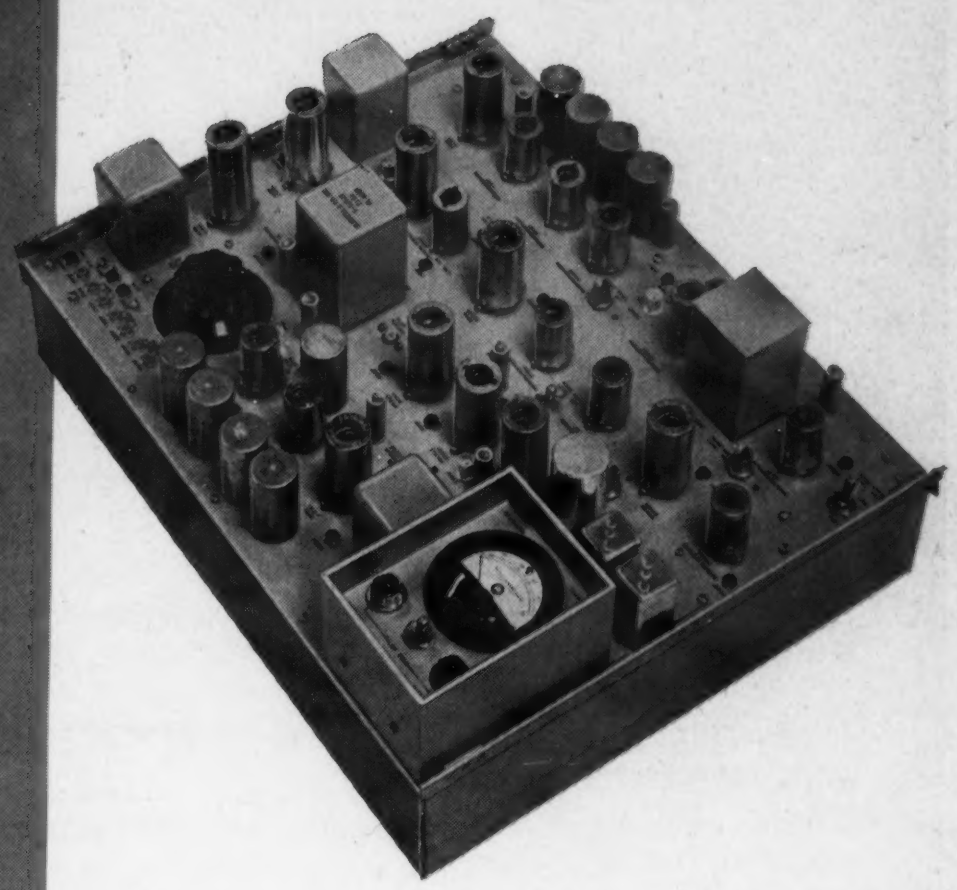

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Radio Interference

The Editor discusses a problem of vital interest to all communicators—that of radio interference. National Headquarters, AFCEA, gives full support to the establishment of a Cooperative Interference Committee to control preventable interference.

SINCE WORLD WAR II, the demands placed on the departments, agencies and committees of Government to deal with the problems affecting our national welfare have been terrific. The ability of Government to make more rapid decisions has become a matter of concern. No longer is it possible for many understaffed governmental agencies to produce answers in the same time and space factor to which we were accustomed prior to World War II.

Whether Government likes it or not, too often it finds itself getting involved in the investigation of problems which could be handled by non-governmental organizations. This is particularly true in the field of communications and electronics as it relates to radio interference. The Federal Communications Commission (FCC), while performing an efficient function, cannot possibly keep up with the increasing number of complaints from geographical areas throughout the United States. FCC accepts the responsibility, it is true, but their staff would need to be multiplied tenfold if they were to investigate and solve each interference case expeditiously. Given time FCC can and does solve this type of problem but in the interim, interference continues to the discomfort of many.

Assistance to FCC

There's an old cliché that "Government governs best which governs least." With this thought in mind, the Armed Forces Communications and Electronics Association has the firm conviction that it can be of substantial assistance to the FCC in the radio interference field by recommending the establishment of Cooperative Interference Committees. Such committees, sponsored by our Chapters and working in cooperation with local and state officials, could perform a useful function.

The objective of any communications system is service. The task of engineering a system capable of providing acceptable service is usually not too difficult. In the field of radio communications, admittedly, there are many factors which must be taken into account by the engineer. These include frequency allocations, systems, propagation and site factors. However, there is one very important factor which the design engineer, to a large extent, is unable to control completely and that is spurious interference.

Control of Preventable Interference

Certainly if a communications system is to be effective, it is not only necessary to provide preventive measures but also to take steps to accomplish the rapid detection and elimination of interference. The formulation of treaties and the enactment of laws and regulations are not alone sufficient to insure interference-free communications. This is no small undertaking and in fact has already extended beyond the capabilities of a federally authorized staff.

The answer is to join hands in a mutual endeavor to control preventable interference. The Cooperative Interference Committee (CIC) idea is a natural development of this concept. The first such committee was formed in 1954 in the Southern California area. National Headquarters, AFCEA, is proud that the idea was developed initially by two Southern California Chapter members, Ray Meyers and Al Parker. Its purpose was to assist the Federal Communications Commission in the huge task of investigating sources of interference from devices emitting radio frequency energy and assisting in its reduction or elimination whenever practicable or possible. The excellent work begun by this California group is gaining nation-wide recognition.

The Cooperative Interference Committee idea is to create industry-wide cooperative groups in a particular locality or area, and to join together existing user groups to advance the industry-wide concept. In operation, the CIC idea is simple. *Through self-made rules of procedure, interference problems affecting a user are channeled to a solution through the committee or through individual members.*

Entire Industry Benefits

The CIC idea is not limited to mutual interference solutions. A committee can attack a general interference problem. Committee organizations achieve their own flexibility of operation within their own prescribed limitations.

Enthusiastic CIC groups have been established in *nineteen geographical areas* with initial membership up to 185. Many others are in the process of organization at the present time, using the Southern California Committee as a model. The ultimate goal is to establish a committee wherever there is such a concentration of radio users that problems of mutual interference develop.

Experience has demonstrated that interference problems can best be resolved by the concerted effort of those most vitally concerned with obtaining the greatest possible use of the limited channels available for communications. A typical group, having self-interest in the elimination of preventable interference, would consist of the radio users themselves, equipment manufacturers, service organizations, and engineers concerned with radio communications systems. *If such a group solves an interference problem or is able to recommend a course of action that will bring about a solution, the entire industry benefits. It is a case where everyone wins: the radio user, the public, and the Government.*

CIC Organization

Following is a more detailed explanation of the terms of reference for the organization of a Cooperative Interference Committee.

Cooperative Interference Committee is a general term used to describe a group of radio users, manufacturers, and service companies that have

joined together for the purpose of resolving radio interference problems with which members are mutually concerned.

Its purpose is to assist industry in the resolution of interference problems. It is an advantage to industry to have an organization through which interference problems can be cleared before the complaint is brought to the attention of the FCC. Individual members of such a group may represent communications systems such as police, forestry, gas or petroleum pipelines, aviation, common carrier operations, industrial, broadcast, government agencies, etc. In addition, representatives of transmitting and receiving equipment manufacturers, service companies, and radio engineers concerned with communications facilities all have a common interest in resolving interference problems through the medium of the Committee. In fact, the membership of one committee may vary considerably from another due to the diverse nature of radio operations and interests which exist in different parts of the country. The area of operation may also be dependent upon local conditions. For example, due to concentration of radio facilities, one committee may be confined to a single large metropolitan area such as New York, Chicago, Baltimore, or San Francisco. On the other hand, in less populous areas a single CIC may be organized for a much larger geographical area. The point is, in either case, that the CIC organizational structure must be flexible so as to provide the type of service required in a particular region.

Members Make Policy

It is desired to emphasize that the CIC is an autonomous organization whose sphere of operation is determined entirely by the wishes of the participating members. The FCC is strongly supporting the formation of CIC's wherever they are needed, and their FCC field representatives will assist established committees when called upon. The Commission does not participate in the direction or operation of these committees. The membership of the CIC nominates and elects officers and writes the rules under which the committee will function. There is no limitation on the number of members. It is thus possible for the committee, on its own initiative, to broaden its field of operation beyond the resolution of interference problems so as to include recommendations to the Commission on changes in the rules or suggestions to industry on equipment needs.

New Area CIC's

In addition to the nineteen committees mentioned previously, organizational meetings were scheduled during February for a Portland, Oregon CIC; Orlando, Florida CIC, and an Elmira-Ithaca, New York CIC. Committees at Dallas, Texas; Pittsburgh, Pennsylvania; Syracuse, New York, and for the Twin-Cities area of St. Paul and Minneapolis, Minnesota, are also scheduled for organizational meetings during the early part of 1957.

Mr. Ewell K. Jett, AFCEA member, former FCC Commissioner, and currently a broadcast executive, has been elected chairman of the Baltimore area CIC to serve for one year.

A very successful committee has been in operation at San Juan, Puerto Rico, since April, 1956. During this time the Committee has resolved 20 major cases of interference without the necessity of FCC participation. This Committee is a typical example of the work that is being done or can be accomplished by committees now in being or in process of organization throughout the United States.

CIC At Work

Some typical examples of interference problems which have been successfully resolved by committees are of interest.

Several mobile services operating in the 152-174 megacycle band reported interference from intermittent, high intensity bursts of very short duration which completely covered the band. Intervals between bursts varied from a few seconds to several hours. This case was referred to the local CIC by the FCC District Office and after an investigation, the source was found. The interference was traced to a defect in the amplifier of a communications transmitter licensed by the Commission. The defect was promptly corrected and the case closed.

An airline reported directly to the San Juan CIC that interference at Ponce, Puerto Rico, was completely blocking their radio communications. Interference was found to result from current leakage on power lines due to a growth of tropical moss. The interference was eliminated by the power company by cleaning power lines near Ponce Airport.

A military fighter squadron began use of a certain ultra high frequency for communications purposes, unaware that this frequency was in use for special flight test transmissions under a license issued by the FCC. The co-channel interference was of such severity as to render the channel useless for flight test purposes. Prompt action by a CIC eliminated the interfering signal within approximately ten minutes from the time the complaint was received.

In conclusion, National Headquarters of AFCEA would be pleased to receive any comment from the national directors and the chapter presidents, regarding the establishment of a Cooperative Interference Committee. We believe that the formation of a committee would be a step in the right direction. Also, we recommend contacting Ray Meyers of the Southern California Chapter, AFCEA, for additional information and a copy of his Chapter's 1957 CIC brochure. It's worth reading.

1957 CONVENTION SPEAKERS

TUESDAY, MAY 21ST: The banquet speaker, Mr. Donald Clinton Power, will cover items of general and specific interest relating to communications and electronics. Mr. Power is President of the General Telephone Corporation. He is a former educator, a distinguished lawyer and holds a directorship in 22 corporations including six on foreign soil.

WEDNESDAY, MAY 22ND: Industrial luncheon. The Honorable Frank D. Newbury and Mr. James M. Bridges will have some important things to say on research and engineering. Their presentations will be followed by a question and answer period.

THE HONORABLE FRANK D. NEWBURY, Assistant Secretary of Defense for Research and Engineering, will explain the operations of his new office and the relationship of this organization to industry and national defense.

MR. JAMES M. BRIDGES, Director of Electronics in Mr. Newbury's office, will discuss the ever increasing complexity of electronic equipment and systems in military applications. Major emphasis will be given to the critical problems developing in our national defense effort. Among these are included sky rocketing costs for weapon system electronic development and production, unrealizable demands upon scientific and engineering manpower, continually more difficult problems of attaining acceptable reliability, and the extension of weapon system development time cycles. Another important aspect of Mr. Bridges' talk will relate to some of the causes for expensive research and development costs for engineering efforts.

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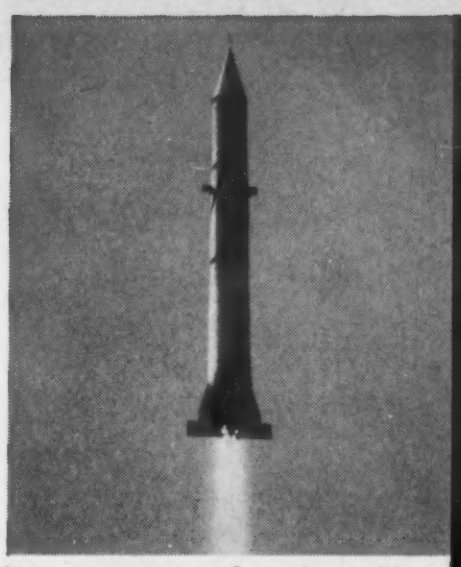

FICo engineers and produces the guidance for the Redstone Missile.
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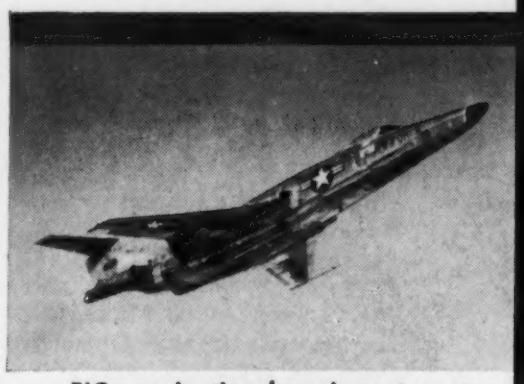

FICo navigational equipment goes into a wide range of aircraft.
U.S. Air Force Photo

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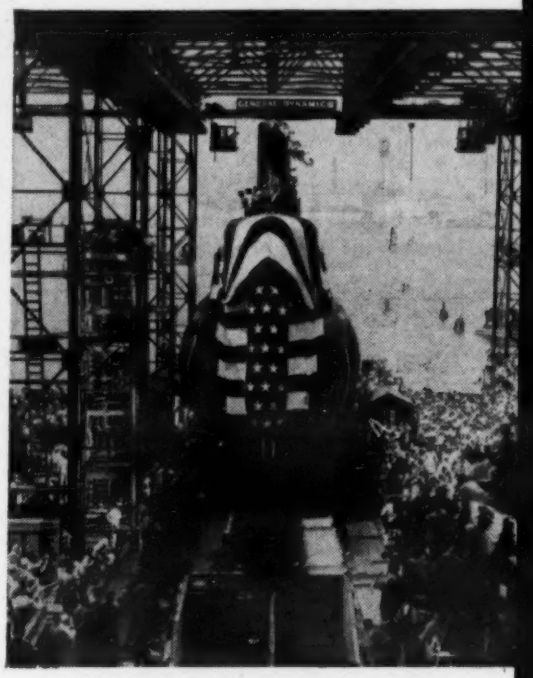
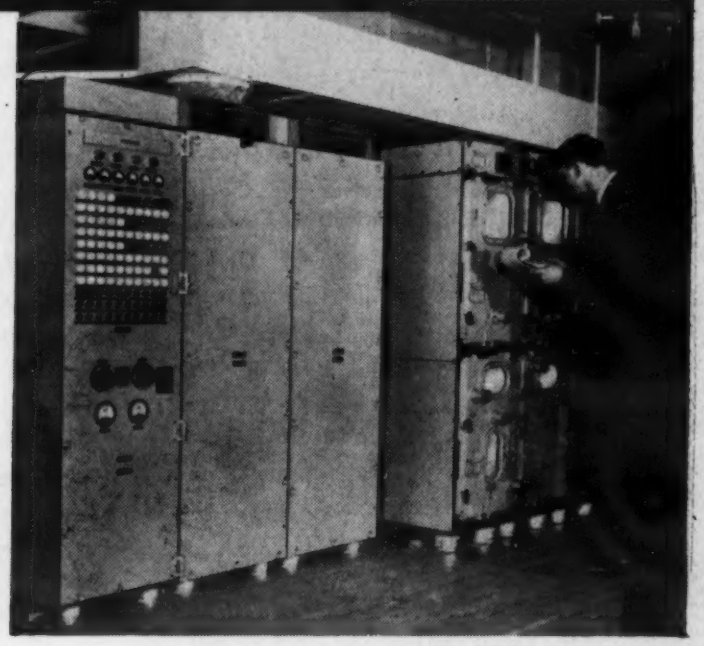


FICo controls are used in the atomic submarine program. FICo is also working toward development of the closed-cycle gas-cooled reactor.
U.S. Navy Photo

FICo research and design led to improved safety and arming device for Army atomic cannon.
U.S. Army Photo



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◀ FICo launching and control order computers are used for Navy A-A missiles.—*U.S. Navy Photo*

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- Daily Technical Sessions
- Trip to Naval Research Labs
- 6 Important Social Events
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This Program means business:

Monday, May 20th

8:30 AM—Sheraton Hall
Opening Breakfast
9:30 AM— **Official Opening of Exhibits**
10:00 AM—Caribar Room
Chapter Presidents Conference
10:00 AM-12:00—Continental Room
Engineering Papers on Research and Application
12:30 PM—Sheraton Hall
Keynote Luncheon
2:00 PM-5:00 PM—Adams Hamilton Room
Industrial Movies
2:30 PM-4:30 PM—Sheraton Hall
Monitored Panel on Scatter Propagation
7:00 PM—Continental Room
Reception
8:00 PM—Sheraton Hall
Buffet Supper

Exhibits: 9:30 AM—9:00 PM

Tuesday, May 21st

9:00 AM—Caribar Room
Council & Directors Meeting
10:00 AM-12:00—Continental Room
Engineering Papers on Research and Application
12:00 AM—Busses to Naval Research Laboratory
Embark at hotel, clearance at NRL, lunch, tour, return at 3:30 PM
2:00 PM-5:00 PM—Adams Hamilton Room
Industrial Movies
7:00 PM—Continental Room
Reception
8:00 PM—Sheraton Hall—**Banquet**
Speaker: **Donald C. Power,** Pres. Gen. Tel. Corp.

Exhibits: 9:00 AM—9:00 PM

Wednesday, May 22nd

8:00 AM—Caribar Room
Officers & Directors Breakfast
10:00 AM-12:00—Continental Room
Engineering Papers on Research and Application
12:30 PM—Sheraton Hall
Industrial Luncheon
Speakers: **The Hon. Frank D. Newbury,** Asst. Sec'y. Def., Research & Engineering, and **Mr. James M. Bridges,** Director of Electronics, Office of Asst. Sec'y. Def., R. & E.
Question and Answer Period
2:00 PM-5:00 PM—Adams Hamilton Room
Industrial Movies

Exhibits: 9:00 AM—5:00 PM

These Technical Papers:

1. "Rapid Fault Elimination in Complex Electronic Systems," by John F. Scully of Monroe Calculating Machine Company
2. "Single Sideband Receivers," by H. F. Comfort of Radio Corporation of America
3. "Single Sideband Applied to Air-Ground Communications," by E. W. Pappenfus of Collins Radio Company
4. "A Single-Sideband Radio Central to Replace Military Wire Lines," by A. M. Creighton and D. B. Reeves of Motorola, Inc.
5. "The Trend of Facsimile in Military Communications," by A. G. Cooley of Times Facsimile Corporation
6. "Processing, Narrow-Band Transmission, and Remote Display of Radar Data," by Sheldon P. Detwiler of Lewyt Manufacturing Corporation
7. "Multiplexing Circuits in the National Air Defense Communications Networks," by J. B. Naugle of Lenkurt Electric Company
8. "The Air Route Surveillance Radar for U.S.A. Air Traffic Control," by Bruce I. McCaffrey of Raytheon Manufacturing Company
9. "The Vanguard Launching Vehicle Instrumentation System," by Vernon J. Crouse, Jr., of The Martin Company
10. "Results of a Simple Technique for Handling Complex Microwave Circuits," by Alexander Horvath of Sylvania Electric Products Company
11. "A Fully Automatic Teletypewriter Distribution System," by R. C. Stiles and L. Johnston of Automatic Electric Company
12. "Some Aspects of Telegraphic Data Preparation and Transmission," by W. B. Blanton of Western Union Telegraph Company

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AFCEA at Boston 1956

Mrs. Mary D. Burke, winner of the 1956 General Electric Edison Award, is pictured here receiving a trophy from Mr. L. B. Davis, General Manager, Electronic Components Div., General Electric Co. Looking on are, right, RAdm. H. C. Bruton, USN, Director of Naval Communications and, left, Mr. Conan W. B. Barger, Mgr., Trans-Continental Relay Network, nominator of Mrs. Burke.

Edison Award 1956

THE 1956 GENERAL ELECTRIC Edison Radio Amateur Award for public service was presented to Mrs. Mary (Mae) Burke, W3CUL, on February 28, 1957.

Mrs. Burke, a 45-year-old housewife from Morton, Pa., the first woman radio amateur to win, handles 3000 radio messages a month for servicemen overseas. Her husband, Alfred, who accompanied her to Washington, D. C. for the award, taught her amateur radio and now maintains her radio equipment, which runs almost continuously. Mrs. Burke was chosen from a total of 50 amateurs nominated for this "Ham of the Year" award.

Industry and Military Attend

Approximately one-hundred people attended the banquet, held in the East Room of the Mayflower Hotel in Washington, D. C. Rear Admiral H. C. Bruton, USN, Chief of Naval Communications and Vice President of AFCEA, gave the principal address. Dr. W. R. G. Baker, General Electric Vice-President and a National Director of AFCEA, served as toastmaster. The trophy and a check for $500 were presented to Mrs. Burke by L. Berkley Davis, General Manager of the G-E Electronic Components Division, which sponsors the annual award. Also attending the banquet were George Bailey, past National President of AFCEA, and Thomas B. Jacocks, General Electric's Washington representative and former President of the Washington Chapter of AFCEA. Members of the pre s were present as well as industrial and military representatives.

Admiral Bruton, during his address, spoke of Mrs. Burke as ". . . a highly dependable, able, and effective communicator. She has faced the finest kind of competition and has been declared the amateur radio operator who performed the most outstanding public service in the Nation during 1956. I extend to her my warm, personal congratulations."

Contributions of Radio Amateurs

Admiral Bruton went on to say: "The accomplishments of radio amateurs in many fields of public service are well known. These include emergency communications in time of floods, hurricanes and other disasters, provided by such amateur organizations as the American Radio Relay League Emergency Corps, the Radio Amateur Civil Emergency Service, as well as by many individual amateurs. The fine service provided by many radio amateurs in connecting phone patches and in handling messages for members of all our Armed Forces and their families, represents a contribution to morale so great it is difficult to measure. It is, of course, in this important field of public service that we of the Armed Forces are so grateful to Mrs. Burke for her splendid performance.

"But I would like to speak briefly of another vital contribution by the radio amateur to public service, i.e., that of active service in our Armed Forces. The record here is impressive. Of the 6000 radio amateurs in the United States in 1917, approximately two-thirds served in our Armed Forces during World War I. More than 25,000 radio amateurs saw active military service in World War II. Large numbers serve today on active military duty; thousands more are affiliated with our inactive reserve forces.

". . . Because of the importance the Armed Forces place upon amateur radio, the military services are steadfast in their encouragement and support of its operation. There are hundreds of U.S. military-sponsored radio amateur stations throughout the world. . . . The U. S. military services also lend strong support to amateur radio in obtaining and retaining radio frequencies, the life blood of amateur operation. As many of you know, at all of the international radio conferences held during the past 30 years, the United States delegation has played consistently a leading role in the protection and acquisition of spectrum space for amateur service . . . firm action must continue to be exercised in the preservation and provision of spectrum space for the radio amateur. I might add that the Joint Communication-Electronics Committee of the Joint Chiefs of Staff organization is well aware of this important consideration.

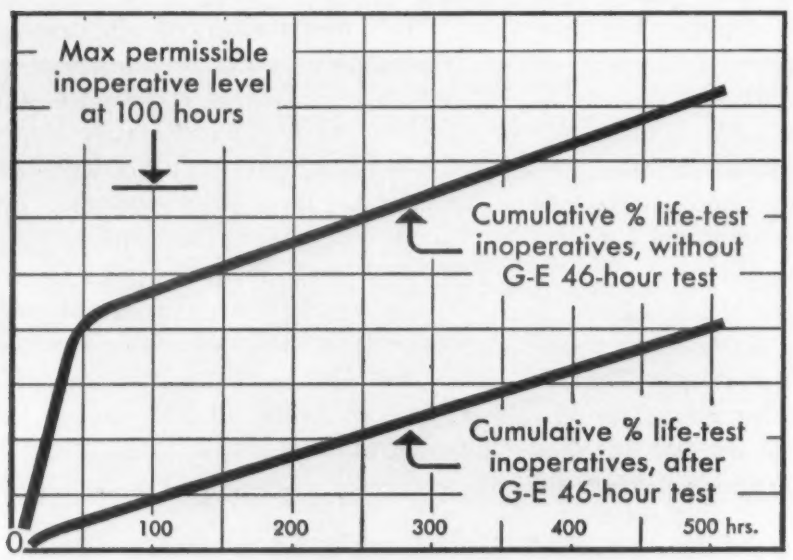
Ideals of the ARRL

"No discussion of amateur radio is complete without mention of the American Radio Relay League, or ARRL, which is virtually synonymous with amateur radio itself in this country. It stands for the maintenance of fraternalism and high standards of conduct, a cooperative loyalty to the traditions of amateur radio, a dedication to its ideals and principles, so that the institution of amateur radio may continue to operate in the best public interest."

General Electric technician checks 5-Star Tubes on special 46-hour inoperative control test, designed to reduce early-life failures. His lint-free, white Nylon garb marks this process as part of Operation Snow White—General Electric's all-out program to exclude from 5-Star Tubes any impurities that can cause short circuits or impair electrical efficiency.

Special G-E 46-hour inoperative control cuts 5-Star Tube failure rate, assures top dependability!

To weed out early-life failures, General Electric operates *all* 5-Star Tubes for 46 hours *prior to* final life testing and shipment. This special G-E procedure joins with impurity-free Snow White tube production to increase reliability and assure full service life. Benefits of General Electric's 46-hour inoperative control procedure are seen clearly from the life-test chart that follows.



Note that the inoperatives in any lot of 5-Star Tubes on life test are only half as many, at 500 hours, as they would be without G-E inoperative control. Furthermore, at 500 hours, the percentage of inoperatives is still far below the permissible figure established for 100 hours.

46-hour inoperative control procedure helps make General Electric 5-Star Tubes the most reliable you can install. Added to special rugged design, Snow White cleanliness in manufacture, and rigid, extensive tests, this special G-E procedure further minimizes tube failure possibility and safeguards electrical performance.

Specify G-E high-reliability 5-Star Tubes when ordering new military electronic equipment! Use them as replacements! *Electronic Components Division, General Electric Company, Schenectady 5, N. Y.*

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GENERAL ELECTRIC

164-1A2

UMI

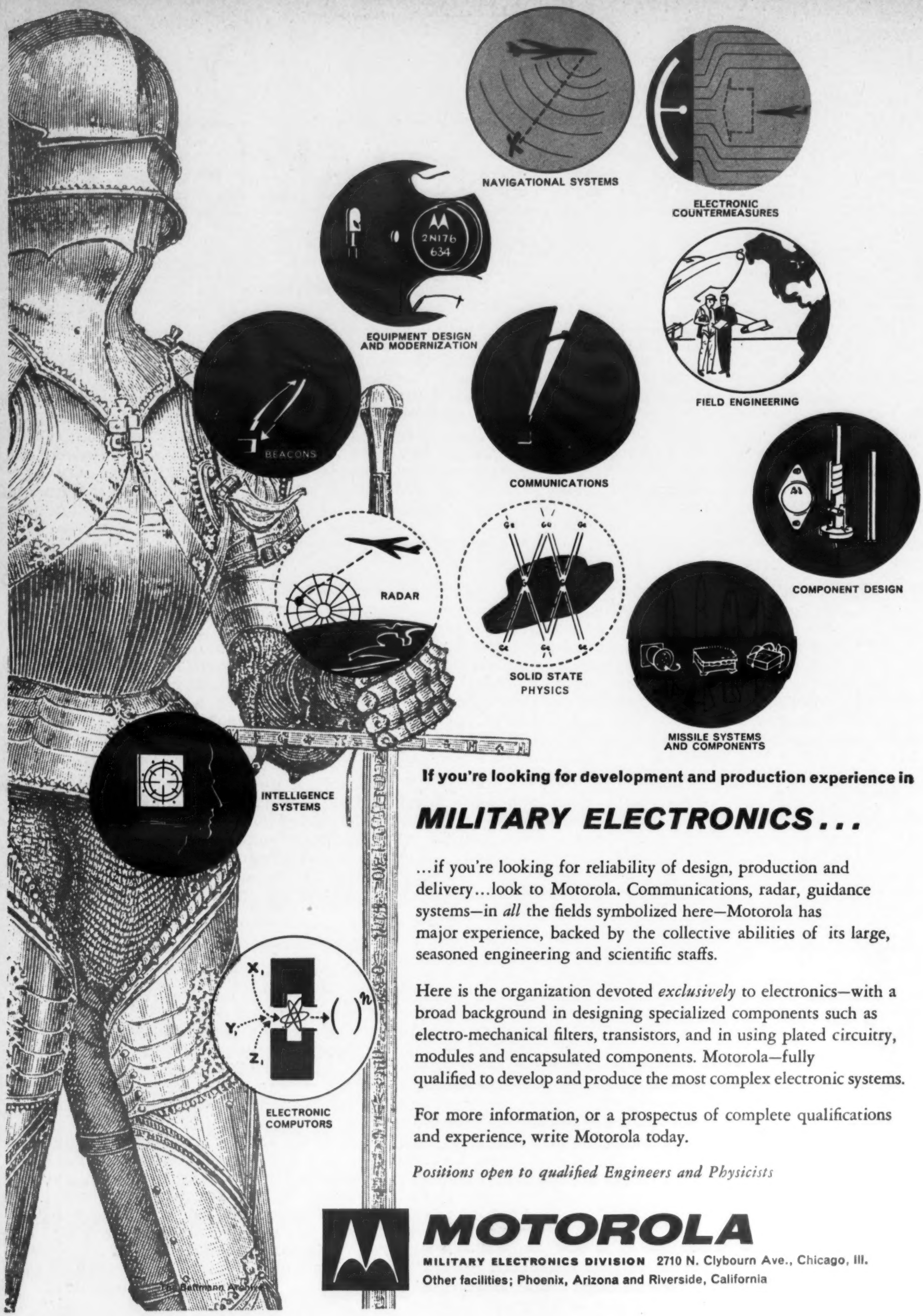
— GOVERNMENT —

NEW ELECTRONIC DATA PROCESSING NETWORK Keeping close control of over a million items of Army equipment, from tanks to transistors, is one of the problems facing today's modern United States Army. To relieve this problem, the Army Signal Corps and the Long Lines Department of the American Telephone and Telegraph Co. are now operating a new electronic data processing network, designed to speed up the flow of supplies and keep stockpiling to a minimum. The system, named Continental United States—Data Transceiver Switching Network (CONUS-DTSN), works in the following way. Telephone lines connect switching centers in five key cities. Interconnected to these centers are 33 military installations. Data transceivers of the International Business Machines Corp. are used to exchange information on punched cards between all network points. Cards punched at one end of a circuit can be duplicated rapidly at the other end using communications lines. An estimated million such transactions can be handled daily. Overall efficiency and reduction of the time required to process and transmit information will bring about great savings for the Army. Studies are under way to determine how CONUS-DTSN can be utilized to ease the transition from peace to war in an emergency.

REACTOR VESSEL PLACED IN ARMY PACKAGE POWER PLANT A 15-ton cylindrical pressure vessel, which will contain the nuclear fuel in the Army Package Power Reactor, was set in the plant recently by construction workers at the Corps of Engineer's Research and Development Laboratories, Fort Belvoir, Virginia. The reactor core, containing highly enriched uranium (which contains a greater concentration of fissionable uranium-235 than natural uranium), is now being fabricated at the Atomic Energy Commission's National Laboratory, Tennessee. The plant is a prototype of "package" power reactors being developed for use at remote bases to eliminate the need of transporting bulky conventional fuels. It will produce 2000 kws of electricity.

NUCLEAR-POWERED GUIDED-MISSILE CRUISER NAMED LONG BEACH A new cruiser, scheduled for completion in late 1960, will bear the name LONG BEACH, the Navy announced recently. She will be the first surface ship to be armed with a "main battery" of guided missiles and powered with a nuclear power plant. Her nuclear reactors will be constructed by the Westinghouse Electric Corp., and her main propulsion machinery by the West Lynn, Mass., plant of G. E. The LONG BEACH will be a twin-screw ship capable of carrying, servicing, and firing the most advanced and effective guided missiles.

CONTRACT AWARDS The following contracts have been awarded by the AIR FORCE: Glenn L. Martin Co., $13,995,100, for TM-61B Matador missile; Bendix Products division of Bendix Aviation Corp., $1,016,468, for brake assemblies, spare parts and data to be produced at South Bend, Ind.; Cessna Aircraft Co., $4,500,000, for Boeing B-52; Grumman Aircraft Engineer Corp., $9,743,522, for inspection and repairs to rescue plane, Albatross; Lear, Inc., $3,961,850, for automatic flight control systems, spare parts for Boeing KC-135 jet tanker-transport; Sperry Gyroscope Co., $2,727,517, for APN-59 radar sets; General Electric's Light Military Electronic Equipment Department, $20 million, for production of airborne electronic countermeasures equipment; General Electric Co.'s Evendale, Ohio plant, $53,141,557, for production of J-79 jet engines; General Precision Laboratory Inc., 2 contracts totaling $4 million, for manufacture of electronic control amplifiers and research and development work on advanced airborne navigation systems. NAVY contracts awarded include: Westinghouse Electric Corp., $8,170,060, to manufacture main steam propulsion machinery for a planned nuclear-powered aircraft carrier; Mack Electronics Devices, Inc., $2,335, 328, receiver-transmitter electronic equipment; Bendix Aviation Corp., $1,985,802, to modify the brakes on F-100 Sabre aircraft; $1,810,144 for brake parts for B-25 and B-26 aircraft; General Electric Co., $1,837,962 for electronic test equipment; Northern Ordnance, Inc., 2 contracts totaling $9,500,000, for armament for guided missile ships; General Electric Co., $4,000,000, nuclear cruiser machinery. *(continued)*



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SIGNAL-GRAM------

NAVY SHIPS HAVE LEFT ANTARCTIC FOR HOME BASES Deep Freeze II units in the antarctic recently teemed with activity as the ships and men of TF-43 prepared for departure on their homeward journey from the south polar region. A 100-percent effective air-drop of 10 tons of supplies and equipment was made Feb. 15, 1957, to the IGY party stationed at the South Pole by C-124's. Four dozen fresh eggs landed without a crack. The wintering-over parties, well quartered, provisioned and possessing the latest in modern scientific equipment, have turned to the tasks of living and conducting research for the International Geophysical Year. All are volunteers and cut off from the outside world by everything but radio.

CREVASSE DETECTOR Army Engineers have developed a device that locates crevasses —the constant fear of expeditionary forces in Arctic and Antarctic regions. The unit creates a low frequency electromagnetic field which is distorted by the presence of a crevasse. Basically, the device consists of 4 "electrodes" placed at 20-foot intervals on disc-shaped sleds and towed by an over-snow vehicle called the Weasel. When the search-head reaches a crevasse, the dielectric difference in the air in the crevasse and the surrounding area causes a noticeable change in the meter recording.

NEWBURY MADE HEAD OF NEW OFFICE Announcement has been made of the combination of the Offices of Assistant Secretary of Defense for Research and Development and Assistant Secretary of Defense for Engineering. The Honorable Frank D. Newbury, principal speaker at the Industrial Luncheon of the AFCEA May Convention, has been named to fill the new position designated as Assistant Secretary of Defense for Research and Engineering. This combination of the two units is designed to strengthen the U. S. defense technical effort.

— INDUSTRY —

SUPERSONIC MISSILES FOR SUBMARINES The Firestone Tire & Rubber Co. has undertaken a program to design, build, test and install a guided missile launching system for U. S. Navy submarines. The launching system is for the Regulus, the 30-foot long, seven-ton, surface-to-surface, jet-powered missile which is capable of carrying an atomic warhead. Company experts believe that this new launching system will extend the Navy's submarine capabilities into the realm of supersonic missiles of tremendous strategic importance.

AN EYE THAT HEARS An "eye" that "hears" quick as a wink is now being used to detect and eliminate interference in the radar, communication and navigation systems of newly-built jet fighter-bombers. The new device, a "radio frequency spectroscope," was developed at Republic Aviation Corporation, and it reduces to half a day the three or more days it has taken to check aircraft electronic equipment on the production line. This check is to make certain that a pilot will be able to hear his radio clearly or that there is no electrical interference with the operation of his radar equipment. Basically, it is a hypersensitive radio set that is plugged into an aircraft's antenna. When an unwanted sound is detected, the set immediately changes it into a wavering line that can be seen on the glass "eye" of the listening device. Company electronic experts are then able to determine the source of the interference and eliminate it before the ship is released to the Air Force.

CHANNEL GUARD In the mobile radio field, General Electric Co. has announced a new tone squelch system designed to relieve two way radio users of the necessity of listening to transmissions of other operators sharing the same channel. It embodies a double-barrelled approach which combines the advantages of both tone squelch and conventional noise squelch. Channel Guard imposes continuous tone on normal squelch to assure a greater degree of privacy in communications than has been previously possible. The system makes it possible for mobile radio users to turn a "deaf" ear to on-channel interference by locking out all signals except those from their own transmitters, which are tone-coded for positive recognition by receivers equipped with the new device.

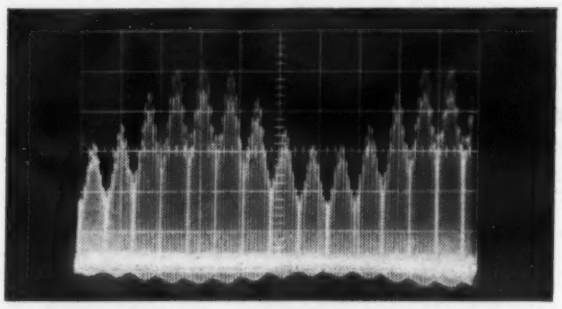
CLOSED-CIRCUIT TV SAVES TIME IN INDUSTRY A closed-circuit television camera, twice the size of a cigar box, is helping to relieve the critical shortage of skilled technicians and to reduce development time of jet engine control systems at the General Electric Company's Flight Propulsion Laboratory Department, Syracuse, N. Y. The TV camera, strategically placed in a controls laboratory, picks up hydraulic-control test data emanating from a computer and immediately pipes it via coaxial cable to an equipment testing engineer some 200 feet distant in another laboratory. The information is received on a monitor similar in appearance to a home TV receiver. G-E test engineers say the new method eliminates the need for two-way phone communications formerly required. (continued)

SAFE from the ground up

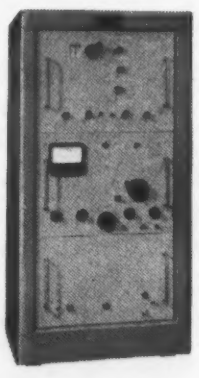
Hoffman Beacon Simulator bench tests TACAN-VORTAC for all-weather flying safety

The Hoffman-developed HLI-103 Beacon Simulator provides a sure, safe way to ground test airborne TACAN—and the TACAN portion of VORTAC. It duplicates the functions of a TACAN Land Beacon (AN/URN-3) and tests airborne units (AN/ARN-21) for azimuth from 0 to 360° with a ±0.2° accuracy or better, and range from 0 to 200 nautical miles with a ±0.1 mile accuracy or better. The Hoffman Beacon Simulator also tests the AN/ARN-21 at instrument airspeed from 0 to 1500 knots, land beacon identity tone and decoding functions—even simulates adverse weather conditions to assure complete operational reliability.

Hoffman TACAN-VORTAC test instruments, now used by the military services, are also available to aircraft manufacturers, commercial airlines and service operators to provide a vital, extra measure of flying safety for air navigation equipment *from the ground up*. Additional information will be promptly sent upon request.



Hoffman HLI-103 simulates the functions of TACAN Land Beacons. Photo shows 135 cps and 15 cps pulse burst detail. Phase relationships indicate surface beacon is due east of aircraft. Comparison of input settings with TACAN dial readings determines operational accuracy.



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SIGNALGRAM------

NEW 'RADIOMARINE' RADAR FOR PASSENGER LINERS A high-definition "Radiomarine" radar system, recently developed by RCA, has been purchased and installed aboard passenger liners SS Independence and SS Constitution, to complement RCA "Radiomarine" radar equipment already on the two ships. The new radar provides six ranges, from one mile to 40 miles, and produces sharp clear pictures of ocean activity on a 16-inch diameter, cathode-ray indicator scope. The new type 12-foot, low-wind-resistance slotted antenna makes possible a narrow beam width of only .65 degrees, providing extremely sharp bearing resolution for navigation in congested waters.

WESTERN UNION INSTALLS TICKETFAX The first Ticketfax system in New York has been installed for the Pennsylvania Railroad at Pennsylvania Station, serving New York, Trenton, Newark and Philadelphia. Ticketfax flashes Pullman and reserved-seat coach tickets in facsimile "picture" form in seconds, from the ticket bureau to customers at the counters of railroad stations. Now it is possible also for railroad customers in the New York area to obtain tickets and reservations by direct facsimile transmission from Pennsylvania Station without leaving their offices. Questions about train departure and arrival times, connections and other travel problems also flow over the facsimile system between the railroad and its customers.

RAYTHEON SUPER-SLEUTH Guided missiles, radars and other defense weapons will be more reliable in action because of a super-sleuth with x-ray vision now used by Raytheon Manufacturing Co. to check special electron tubes going into these devices. The sleuth photographs up to 18,000 subminiature tubes per day and ferrets out flaws hidden from the human eye which some day may cause that tube and the weapon using it to fail. It probes each midget tube from three different angles, revealing its innermost structural secrets. The x-rays peer through the tube's 30 or more delicate parts cramped into a space only one inch long and a quarter-inch round.

ELECTRONIC SYSTEMS IN TELEPHONES Laboratoire Central de Telecommunications, the French research associate of International Telephone and Telegraph Corp., has recently developed and made practical fully-electronic automatic switching equipment, and a 20-line exchange for the French Navy. In the equipment, the automatic interconnection among 20 subscribers, and the supply of tones and ringing equipment, are carried out by static electronic components; all mechanical movements and metallic contacts are eliminated, and are replaced by magnetic cores that can assume two different conditions, which allow or impede the flow of electrons through semiconductor elements.

"AMPLITRON" TUBE BEEFS UP RADARS Military secrecy has been lifted from a new electron tube called an "amplitron." Developed by the Raytheon Mfg. Co., Waltham, Mass., the new tube effectively "beefs up" the radar's performance by amplifying or boosting the energy output of the basic signal as much as 8 to 14 times. When added to the air traffic control radars now being built by Raytheon for the Civil Aeronautics Administration, the effective range of these sets will be increased from 200 miles to about 350. The tube is extremely valuable for use against enemy electronic jamming and as a navigational aid for military and commercial aviation.

SPERRY TO PRODUCE DEVICES FOR OUTER-SPACE High-precision missile devices, instrumental in harnessing the tremendous energy released by the new "exotic" fuels, will be developed and produced by Sperry Gyroscope Company's Air Armament Division. Currently used as guided missile propellants, such solid and liquid fuels hold great promise for tiny, self-driven, precision instruments. Solid propellants are non-radioactive and basically stable when used in such instruments and may be safely machined, drilled and handled. If ignited with a match under room conditions, they will burn like a cigarette; when fired in a suitably enclosed container, enormous amounts of energy can be obtained instantly.

NEW RCA RADAR DEVELOPMENT A new instrumentation radar system which for the first time makes possible direct calibration and immediate evaluation of the performance and behavior pattern of guided missiles has been developed by Radio Corporation of America. It is capable of tracking with accuracy over extended ranges, in darkness, through clouds, and under any atmospheric conditions, to yield data that can be reduced almost instantly to final form.

INDUSTRY ADVISORY CONFERENCE The Mayflower Hotel, Washington, D. C., was recently the scene of the Industry Advisory Conference on Electronic Information. Lynn J. Bartlett, Jr., president of Information for Industry and sponsor of the Conference, summarized its action and decisions. Other major subjects discussed included the format and content of IFI's 1956 Uniterm Service to U.S. Electronics Patents, the possible expansion of the new edition to cover proceedings and activities of professional electronics and related societies, and the desirability of back-indexing U.S. Electronics Patents issued during 1950-1954. (*continued*)

EARLY TELETYPEWRITER

TELETYPE MODEL 28 PRINTER

50 years that changed the picture

The need for a reliable printing telegraph instrument that would provide a typed record of the message for both sender and receiver brought the company now known as the Teletype Corporation into the picture in 1907. From the halting performance of the original page printer to the smooth 100 words per minute of today's precision equipment has been a major step in communications.

But today Teletype equipment is often far more than a communication instrument. It is a basic element in production control systems . . . its ability to transmit and reproduce text and punched tape is harnessed to office automation . . . it provides a "conveyor system" for channeling complex raw data to a computing center thousands of miles away — and getting the answers back in a twinkling.

Indeed, Teletype machines have made many of the dreams of 1907 a daily part of today's business world. And the horizons widen daily as new dreams occupy our engineers and keep our laboratories humming.

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SIGNALGRAM—

COLONEL DONKIN JOINS PAGE Page Communications Engineers, Inc. has announced the appointment of Colonel Forrest W. Donkin, USAF, formerly Deputy Commander of the Army Airways Communications System (AACS), as Vice President and Director of Operations, Western Division. The firm's Operations Department has been expanded into Eastern and Western Divisions. The Western Division covers all PCE projects in the Pacific and Asian areas. Colonel Donkin is an AFCEA member.

NEW POST FOR FREEMAN James M. Freeman, News Service Manager for American Telephone and Telegraph Co. in Washington, has been appointed Assistant Vice-President, Public Relations, of the Michigan Bell Telephone Co. in Detroit. Mr. Freeman took up his new assignment in March. He is succeeded by Philip D. Taylor, formerly Assistant Vice-President, Public Relations at Indiana Bell.

NEW POSITION FOR GENERAL COLLINS Appointment of General Samuel Pickens (Pick) Collins as Manager, Operations of Army and Non-Military Services, Government Service Department, RCA Service Co., Inc., was announced recently. General Collins, who retired in 1956, has an extensive background in communications. He received his first amateur radio "ham" license in 1920, and much of his Army service was spent in various Signal Corps activities. At the time of his retirement, he was serving as Chief of the Army Security Agency. He is a graduate of the United States Military Academy, Class of 1926, and a member of the AFCEA.

NEW APPOINTMENT FOR EWING Dr. Douglas H. Ewing, Vice-President, RCA Laboratories, has been named Vice-President, Research and Engineering, of the Radio Corporation of America. Dr. Ewing will be responsible in his new position for RCA's laboratories and engineering services and will have his headquarters at the David Sarnoff Research Center, Princeton, New Jersey. Dr. Ewing joined RCA in 1945 as manager of the Teleran Engineering Section of the RCA Victor Division. From 1949 to 1951, he was granted a leave of absence from the company to serve on the Air Navigation Development Board in Washington. Returning in 1951, he became Director of Research Services of the RCA Laboratories. Subsequently he served as Director of the Physical and Chemical Research Laboratory and as Administrative Director, RCA Laboratories, until his appointment as Vice-President of those labortories in 1955. He is a member of the AFCEA.

— GENERAL —

TRAFFIC CONTROL Effective use of closed-circuit television in traffic control may be the answer to choking traffic problems now faced by most American cities. This is the way such a system could be coordinated from a centralized traffic-control bureau as described recently by a G-E electronics expert: Closed circuit TV cameras would be strategically located along busy cross-city intersections and each camera would be focused on a system of mirrors at the intersection. The mirrors, in turn, would afford a view of traffic flow from all four directions of the intersection. By a system of measured stadia or graduated marks on each mirror, the distance of traffic from the mirror could be calculated. A traffic coordinator, seated in front of a bank of television monitors at a central traffic bureau, could thus view traffic conditions at any number of intersections.

HIGH SPEED PHENOMENA DEVICES What would happen if a meteor struck a guided missile or an airplane traveling in the upper atmosphere? A device that will enable the Air Force to study this and other high-speed phenomena is being investigated by scientists at Armour Research Foundation of Illinois Institute of Technology. The Air Force Office of Scientific Research has contracted the Foundation to investigate the application of electromagnetic principles to the design of a high velocity linear accelerator.

BILL TO AID EDUCATION Aimed at easing the shortage of technical and scientific personnel in the U. S., Senator Warren Magnuson (D., Wash.) has introduced a measure which would set up a $250 million revolving fund against which young men and women planning careers in engineering, science, teaching and medicine, could borrow up to $750 a year or $5,000 for an entire college career.

NATIONAL CONFERENCE ON AERONAUTICAL ELECTRONICS Dayton, Ohio, will be the scene, on May 13, 14, 15, 1957, of the Ninth Annual National Conference on Aeronautical Electronics, which will be co-sponsored by the Institute of Radio Engineers, Dayton Chapter. The keynote is "ELECTRONICS, the Key to Aviation's Future," and Paper Tutoriums will be held about such subjects as Navigation, Communication, Electronic Equipment and Environment, in which everyone may participate. Principals in a Forum on the subject of "New Ideas in Airborne Electronics" will be H. Leslie Hoffman, president of Hoffman Electronics, and RAdm. Rawson E. Bennett, Chief of Naval Research.

A Reunion And An Award

The Veteran Wireless Operators Association presents the Armed Forces Communications and Electronics Association an award for ten years of service in the Communications-Electronics field.

The presentation of the Lee De Forest Commemorative Plaque was made by Mr. William McGonigle (right), President of the VWOA. On the left is Brig. General David Sarnoff, Chairman of the Board of Directors, RCA, who was a guest speaker at the banquet. George W. Bailey, former National President of the AFCEA, received the award for the AFCEA.

ON FEBRUARY 21, 1957, THE VETERAN WIRELESS Operators Association assembled in New York and united in celebrating the thirty-second anniversary of their founding. Mr. William McGonigle, president of VWOA and toastmaster for the occasion, arranged for a social event long to be remembered.

It is interesting to note that the purpose of the VWOA is to foster and extend an "esprit de corps" among wireless operators. It promotes a fraternal and comradely sentiment among its members and recognizes meritorious service rendered by wireless operators on land, at sea, or in the air, by the erection of memorials and by the bestowal of testimonials, medals, scholarships, or other suitable awards. Also, the VWOA functions to acquaint the public with the work, traditions and ideals of wireless operators, and to perform and encourage any other purely fraternal activities adjudged helpful to the wireless profession.

Since the inception of this organization, awards have been made to the most deserving based on achievement, code proficiency, commemoration, history, honor, merit, pioneering, service and valor.

Since the very beginning of the Armed Forces Communications and Electronics Association, we have believed that the overall principle of inseparability of the civilian-military team would be the essential cornerstone in our efforts to build for the economic future and the military strength of our United States.

In this age of prolonged international tension, social revolution and industrial revolution, struggle for power and leadership may be long and costly but well worth the effort if we are to fulfill our national objectives of peace on earth without damage to our American way of life. Therefore, the cementing and promotion of the civilian-military team concept becomes ever increasingly meaningful. The AFCEA, since its foundation in 1946, has through its magazine, SIGNAL, consistently covered the technological advances, new developments, and requirements in the fields of communications, electronics and photography. By so doing, SIGNAL has been the contact between, and a strong supporter of, our industrial and military establishments.

Being a patriotic, scientific and non-political organization, it has bridged the gap for information— information which has been beneficial to our industrial development and economic growth and to the strengthening of our national security.

Recognition for Service

In recognition of the part which the AFCEA has played in keeping with the above-mentioned objective, the Veteran Wireless Operators Association, in conjunction with its 32nd Annual Dinner Cruise, Hotel Sheraton-Astor, New York, on Thursday, February 21, 1957, presented the Association with a plaque. The presentation was made by Mr. William J. McGonigle, President, in acknowledgement of a decade of meritorious service in the fields of communications and electronics. Mr. George W. Bailey, a past National President of AFCEA and a member of its Executive Committee, received the plaque in the absence of Colonel Percy G. Black, National Presi-

Electronic News

Honored guests at the 32nd Annual Veteran Wireless Operators Association Dinner held at the Sheraton-Astor are: (Seated) Col. W. J. Baird, Editor, SIGNAL; Raymond F. Guy, National Broadcasting Co.; Charles A. Rice, United Electronics Co.; E. H. Rietzke, Capitol Radio Engineering Institute; Maj. Gen. James D. O'Connell, Chief Signal Officer, U. S. Army; Brig. Gen. David Sarnoff, Chairman of the Board of RCA, who received the first Lee De Forest Gold Medal; William J. McGonigle, N. Y. Telephone Co., and George W. Bailey, Executive Secretary, Institute of Radio Engineers. (Standing): Thompson H. Mitchell, RCA Communications, Inc.; Maj. Gen. Robert E. Condon, Director of N. Y. Civil Defense; H. T. Hylkema, Radio Holland, Amsterdam; E. N. Pickerill, RCA (retired); A. J. Costigan, RCA Communications, Inc.; Captain Lawver, 3rd Naval District, N. Y.; Thomas P. Seward, 3d, Malverne, N. Y. high school student who was presented with the first Lee De Forest Scholarship; Emery H. Lee, Federal Communications Commission and J. R. Poppele, Voice of America.

dent of the Armed Forces Communications and Electronics Association, who was unable to attend because of illness.

Highlighting the events of the evening was an address by Dr. Lee De Forest, affectionately known as "Doc" by his many friends. Dr. De Forest spoke from California and his message was relayed over long-lines to the banquet hall where the gathering of three hundred members of the VWOA listened attentively and applauded his stimulating address loudly. Among the many inspiring remarks made by Dr. De Forest was the following tribute to the Armed Forces Communications and Electronics Association:

"I salute the American Armed Forces afoot, afloat, and in the air, for bringing about the rapid development of the electronics industry; from its crudest beginnings of wireless to the modern miracles of radar, sonar, and guided missiles.

"It is therefore my pride and pleasure to know that the Veteran Wireless Operators Association is presenting a Lee De Forest Commemorative Award to the Armed Forces Communications and Electronics Association. I can wish you no greater honor than that AFCEA continues to expand, to keep apace with the almost inconceivable progress of the Art, the Service, and the Industry known today as 'Electronics.'"

Other Presentations

Another highlight of the evening was a down-to-earth talk given by General David Sarnoff, past National President and a present Director of AFCEA, and the presentation to him by president McGonigle of the first Lee De Forest Gold Medal. The award was made for 50 years of outstanding accomplishments and service in the fields of wireless, communications, and electronics. Also honored at the dinner were Major General James D. O'Connell, Chief Signal Officer of the Army and Rear Admiral H. C. Bruton, Director of Naval Communications. Both of these distinguished military leaders received certificates awarding them honorary membership in the VWOA. Other members of the AFCEA who have been honored in the past and both of whom are past presidents were George W. Bailey and Rear Admiral Joseph R. Redman USN, (Ret.).

Brig. Gen. David Sarnoff receives the first Lee De Forest Gold Medal from William McGonigle as Maj. Gen. James O'Connell looks on.

Major General James D. O'Connell is awarded an honorary certificate for membership in VWOA by President William J. McGonigle.

Mobilization Readiness 1957

by Paul A. Longo

Chief, Planning Division
New York Chemical Procurement District
U. S. Army

THE CURRENT WORLD SITUATION necessitates the maintenance of a strong U.S. Military Force consistent with our national economy. Thus, military preparedness must include industrial readiness as an integral part of defense mobilization.

The United States Government has developed a mobilization plan which establishes the industrial base and furnishes logistic support for the operational readiness of the Army, Navy, and Air Force. The Government wartime organization and necessary controls have been predetermined and are in standby for immediate implementation. Proclamations have been written. The Nation could be under control within twenty-four hours if total war should break out. This will insure the most effective use of the Nation's resources geared to a wartime economy. The Office of Defense Mobilization, the top Government Agency responsible for this phase of the Planning Program, has promulgated the necessary wartime controls.

Standby legislation is in the books ready to be invoked incident to any emergency. For example, the Defense Production Act provides the legislative authority for the application of priorities and allocation powers. Civilian control agencies are in being which can readily be expanded to cope with increased wartime procurement.

Ultimate Objective

The ultimate objective of today's plan is to have sufficient material in stock and provide immediate production from tooled-up facilities or arsenals to support a major conflict in the first stages of war. To produce the weapons of war, roughly fifty-five percent of the national economy will have to be diverted from civilian to military production on M-Day.

The military planning program of today is dynamic. It must keep pace with the changing concepts of war and the rapid advances in technology and design. Hence the planning, of necessity, is directly concerned with the operational plant and product level.

Three Essential Elements

Practical production engineering is applied to assure a realistic industrial base to the Services. For example, three essential elements must be taken into account: 1) production, 2) inspection, 3) packaging and preservation. Concentration in any one of these fields without considering the other two can be disastrous. Production may satisfy requirements, but if quality is sacrificed for quantity the items may be useless to the troops in the field. For example, consider the waste of human and material resources that are sacrificed if the items produced do not function because of sub-standard quality. When the element of inspection is overlooked or subordinated, the enemy finds itself with an unexpected ally. Such was the situation in World War II when in the Pacific our torpedoes failed to explode time and time again.

Consider, also, the waste of materials and dollar losses when the end product, although complying with specification requirements and inspection standards, is destroyed or deteriorated due to faulty packaging or inferior preservation. The cost to the United States during World War II ran into the millions of dollars, particularly in the Pacific Theatre. Therefore, production, inspection, and packaging must be considered as integral parts of the production plan. Planning military production must be practical and realistic and it must parallel industry planning for commercial production. To do this, a detailed technical review is made of the drawings and specifications for items to be produced. These must be completely definitive to be adequate for mass production. The technical review establishes the tooling requirements for the job to be done.

In computing the manufacturing rate, the lead time necessary to get into production is a primary consideration. The production losses resulting from uncoordinated lead time cause materiel deficits during the critical first year of war. Since the time-scheduling of requirements is congruent with the war plans of the Joint Chiefs of Staff, the lead time production losses cannot be made up. Therefore, aggressive production planning must be continued. Machinery is set in motion for action by the Military Services to minimize or eliminate the production deficits.

Avenues For Military Planning

What avenues are open to the military planner to eliminate critical shortages? There are several, and each is based upon the specific cause for the loss in time. For example, a facility would not be expected to have on hand special tooling peculiar to the manufacture of a mechanized flamethrower. This tooling would consume approximately 12 months of valuable time to fabricate during an emergency. The Service, therefore, must acquire these tools and place them in long term storage at an arsenal or the facility designated for the manufacture of the end item.

(*Continued on page* 24)

UMI

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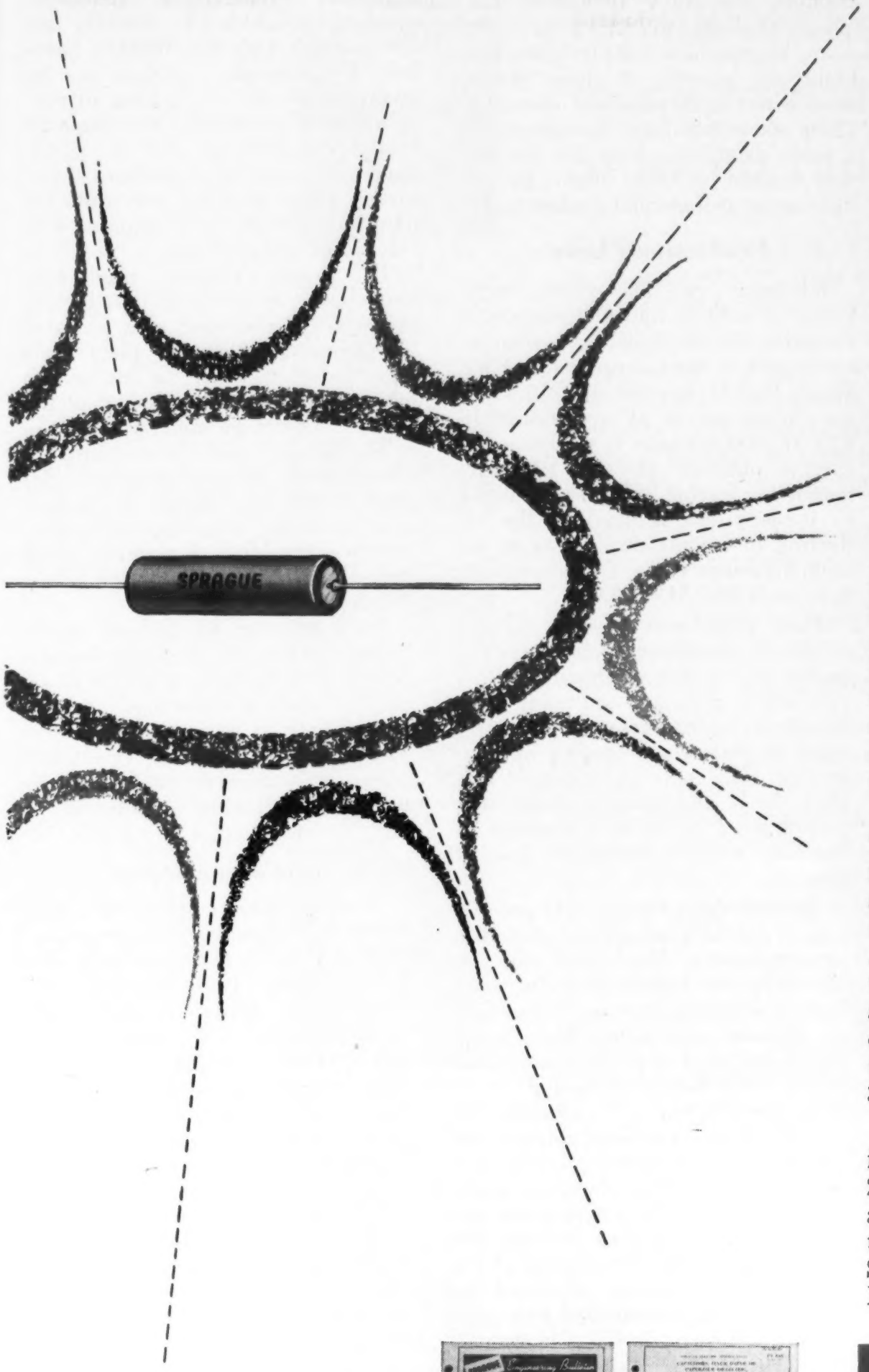
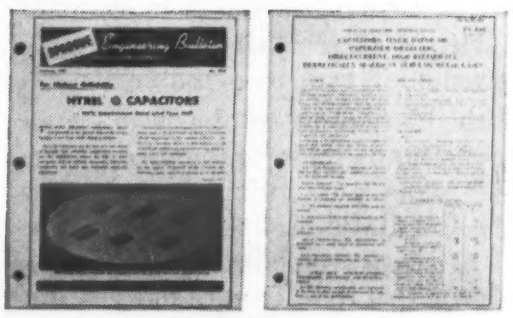


The name "Hyrel" heralds a complete new line of Sprague Capacitors conforming to the most rigorous set of capacitor specifications ever written. Techniques, materials, and processes combine to make it the most reliable paper capacitor possible within the present state of the art. After two years of exhaustive pilot runs, these high reliability units are in high volume production *now*.

In missiles, jets, warning networks, computers, controls . . . *wherever reliability is important* . . . Hyrel Q capacitors find scores of applications. A glance at Sprague Specification PV-100 tells you why. It's far above and beyond commercial or present MIL military levels . . . and it calls for outstanding performance under high *g* shock, vibration, humidity, immersion, as well as under accelerated life test. Complete facilities for making every test called for have been installed in a special plant area in which Hyrel Q capacitors are manufactured by specially selected personnel.

The first Hyrel Q capacitors—Type 195P—are subminiature metal-clad paper units hermetically sealed with *compression*-type glass-to-metal solder-seal terminals. Available in both conventional tubular and screw-neck mounting styles, all are Vitamin Q impregnated and designed for operation from −55°C to +125°C. Voltage ratings of 200, 300, 400, and 600 VDC are standard.

Complete technical information is provided in Engineering Bulletin 2900 and Specification PV-100. Both are available on letterhead request to the Technical Literature Section, Sprague Electric Company, 287 Marshall St., North Adams, Mass.



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(*Continued from page* 22)

Obviously, having these tools in reserve eliminates this element of delay and permits production during the early quarters of the first year after M-Day.

When a current production job is completed, the tools and equipment may be either stored and maintained at the producing facility under contractual arrangements with the Government or placed in Government storage. It is more desirable to retain tooled-up integrated production lines under power if possible. These lines may include special tooling, inspection gauges and long lead time production equipment. This, of course, is expensive. With the emphasis on practical economy, only in cases of the very highest priority can the maintenance of production lines under power be justified.

Effects of Technological Advances

Production planners recognize technological advances being made in industry and consider the effects upon machine tools in the military reserve. To avoid stagnation characteristic of inactive facilities, the planners consider changes in techniques and production processes as they affect this tooling. For example, great strides are being made in the field of automation. The adaptation of an automatic production system can obsolete existing production lines in storage. Therefore, critical reviews are being made of the equipment in the military reserve. Only that equipment of the quality and capacity desired is to be retained. The retention of equipment is justified only by the return to the Government of immediate production upon demand. The Department of Defense has taken this practical viewpoint into consideration and a new look is being given the Reserve Tool Program.

To improve industrial production capabilities and to further minimize production losses caused by lead time, the industrial plant reserve program is a necessary adjunct to mobilization readiness. Although the Department of Defense places maximum reliance upon American private industry for materiel, certain specialized facilities were retained by the Army, Navy and Air Force. To fulfill the United States and allied materiel requirements procured by the Army during World War II, the Government authorized over $10,000,000,000 for expansion of industrial facilities. Most of the plants were declared surplus after World War II. Sixty complete, specialized industrial plants were authorized to be retained after the war; the aggregate cost being in excess of $2,300,000,000. Since World War II, additional plants were sponsored by the Services. For example, the Navy sponsored 221 industrial plants; the total acquisition cost approaching $4,000,000,000. Eighty-six percent of these plants were active and privately operated. These plants now form the nucleus of a ready production base for specialized critical military items having little or no commercial counterpart.

Production Plants

Whenever possible, plants were leased or sold to industry subject to recapture to minimize the maintenance cost to the Government. After World War II, the cost was estimated for Army plants at approximately $25,000,000 annually to maintain the special purpose plants. However, maximum leasing of these facilities to industry has resulted in the reduction of maintenance costs at an annual savings to the Government of approximately $11,000,000.

These plants will be ready for operation by the lessees as mobilization producers. M-Day production schedules will be arranged and many technological details worked out with respect to plant rehabilitation or conversion. The combined assets of machine tools and reserve plants will permit the U.S. military machine to function with a minimum loss of time.

Another deterrent to early production is the lack of critical materials or components. Much time and loss of production had resulted from the lack of advance planning in the field of materials allocation. Here again the Department of Defense has eliminated "Administrative Delays" to insure distribution of materials for ratable items. Uniform policies and procedures for applying controlled materials allocations plans for implementation on M-Day have been prepared by the Office of Defense Mobilization and the Department of Defense. The materials allotment requests will be documented and processed by the responsible Government authority to ascertain the ultimate allotments of required materials.

With increased emphasis on new weapons and their impact on strategic plans, mobilization requirements for these weapons are correlated to existing technology and production capacity. These changes dictate revisions to mobilization plans. Similarly, changes in industrial technology require a re-evaluation of production plans. Production methods must be re-explored for improved techniques and reduction in costs and critical materials affected. This is accomplished by projects known as Industrial Preparedness Measures, which are conducted by industry under contract with the Military Services. For example, contracts are let to investigate the application of new or alternate materials. New tools or fabrication methods may be developed or production procedures formulated. Chemical plants and processes may be redesigned to improve efficiency and reduce costs.

To insure current production know-how, educational production projects are arranged with industry by contract. These are plant scale pilot orders designed to educate facilities in new techniques applying new equipment or materials.

The flexibility of the mobilization plan permits its implementation for any type of war, whether it be short or long range. There are no administrative shackles of rigidity which will delay the implementation of the plan.

No longer are we lacking legislative authority. The National Security Act of 1947 has been amended to adjust to current situations. Standby legislation can be implemented with minimum loss of time. Production plants and materials can readily be mobilized. Standby orders are a reality.

Action on D-Day

Since we have established a flexible mobilization base to support any type of war, the plans can be invoked at any time. The competitive bidding system, under full mobilization conditions, will not predominate the procurement program. Although price remains as a primary consideration under any procurement situation, it loses its position of supreme importance on M-Day in relation to schedules of delivery of weapons to the troops engaged in active warfare.

Today's planning has been blended with the vital ingredients consisting of "Plants and Products." Realism is constantly being injected into the program. Within the limitation of funds available to the Department of Defense and its Military Services, a dynamic planning program is in operation to assure and maintain a practical and ready mobilization production base.

What remains on D-Day is action to put this forward progress into operation. This is a must lest we repeat the inadequacies of the past.

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Earth satellites, FM, TV, radar, transistors, scatter propagation, solid state electronics point the way to the markets of tomorrow. In radio-electronics, the radio-engineer builds these markets as he builds idea upon idea. His ever widening knowledge makes this an industry of rapid obsolescence. Progress is spelled in newness – printed circuits, computors with memory feed-back control, telemeters that reduce radio signals to understandable data, completely automatic factories.

Radio-engineers have made radio-electronics a giant. This comparatively young field will reach a 12 billion dollar volume this year and promises, within half a decade, to rival the automotive field as our nation's largest industry! IRE always remembers the men responsible for this growth.

The Institute of Radio Engineers is a professional Society of 50,000 radio-electronic engineers devoted to the advancement of their field of specialization. Their official publication, *Proceedings of the IRE*, is concerned solely with these men and their accomplishments. And *Proceedings of the IRE* is the only engineering journal in the radio-electronic industry exclusively edited *by* and *for* radio-electronic engineers.

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Stewart-Warner Electronics has pioneered in the development of solid state circuitry. Out of a manufacturing environment second to none, Stewart-Warner Electronics is mass-producing equipment containing solid state devices by the thousands of units.

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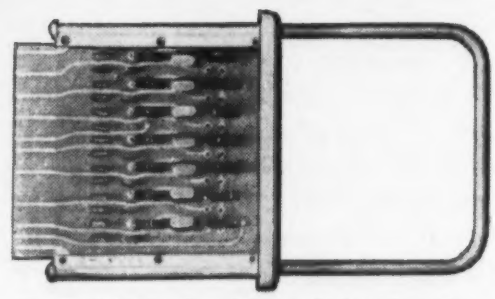

One of 160 plug-in modules for the desk-size Stewart-Warner Data Processing Unit. Modules employ solid state circuitry to save space and eliminate many vacuum tubes.

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UMI

The Sunny Side

by Robert F. Brady

Chief Engineer for Communications Systems
Office of the Chief Signal Officer

Although known for its wartime accomplishments, the Signal Corps performs many activities which have their "sunny" side in peace-time application. Such an example is the ANGRY-9.

ELSEWHERE YOU WILL READ OF the Army Signal Corps as an agency with an unmatched record of activity in many of the sciences, primarily as they relate to military purposes. But any work in the sciences will have its peaceful applications as well. The Signal Corps' services in meteorology preceded those of the U. S. Weather Bureau. Its work in aeronautics dates back to the Wright brothers. It has won its "Oscar" in photography and received numerous other evidences of recognition of its continuing excellence in this field. The Army Signal Corps has pioneered many advances in electronics, and these too have their "sunny" side.

Radio wave propagation research, radar and communications equipment development, electronic components work, cooperation in standards and regulatory activities, and extensive operations and training missions in the field of electronics are among the many and varied efforts of the Army Signal Corps, in the most rapidly advancing science of electronics. All of these activities are paying dividends for peaceful purposes.

Origins of the "Angry-9"

The history of our nation is one of peaceful endeavor. By comparison our years of warfare have been relatively few. It is logical then, to expect our military agencies, to as great an extent as possible, to contribute to our peacetime well-being.

The story of one radio communication set has, in addition to its primary military aspects, certain examples of the use of Army Signal Corps equipment in peaceful roles.

Officially known as "Radio Set AN/GRC-9", this equipment has been dubbed the "ANGRY-9" by troops. Its story really started in 1942.

Many will remember that we had the SCR-131, SCR-161 and SCR-171 radio sets when the war started in 1941. The SCR-284 was rushed into production to replace these three sets for general purpose field radio communications, with provisions for operation in a vehicle also. This was the so-called "short-wave" set, using part of the high frequency (HF) band. Miniaturization had not then had its effect, and the SCR-284 was not compact (to say the very least!).

By mid-'42, when the initial attacks on our forces had been blunted, we in research and development began to receive requests for advanced type equipment—to be delivered in a few weeks' or months' time. Parachute troops, special missions, jungle warfare and other operations dictating new tactics also required new equipment.

Parachute battalions being organized in 1942 required a long range radio set that could be dropped by parachute to provide them with communications from their drop zone to base station. A development contract was given to The Rauland Corporation by the Signal Corps laboratories and work on a "Radio Set SCR-694-( )" was begun. It had to be a small and rugged set, versatile in operation. The task was not an easy one at that time, with the components available and urgency needed. Were you to go back and look over the shoulder of the design engineer, you would recognize the basic configuration of the AN/GRC-9. Rauland had worked before with Signal Corps laboratory engineers in production and development of sets of similar nature, and that experience contributed to the design of the SCR-694. The set got to the paratroops, and we heard stories such as that about the one that dropped into a small river in Northern France during Operation Overlord and was not retrieved for two days, yet operated when set up.

SCR-694's on Special Mission

Meanwhile, late in 1942, the First Special Service Force planned an operation that would use small tracked vehicles and require a radio set to fit in a restricted area in the vehicle. The development of the SCR-694 was progressing and the Rauland Corporation undertook to produce the required quantity of SCR-694's and a number of receivers alone (the SCR-714) in a matter of weeks. Rauland's people worked closely with personnel of the First Special Service Force and the Signal Corps in meeting the special requirements of the mission. And one of the special requirements was that the sets be painted *all white!* So, to distinguish these from later models to be furnished for regular troop use, they were identified as "SCR-694-AW" and "SCR-714-AW"! The SCR-694-AW was the first version of the

design that became the ANGRY-9.

Wasn't it the famed "Merrill's Marauders," under General Stilwell in Burma, that needed a set that could be packed through the jungle and communicate over hundreds of miles? Because the frequency range of the SCR-694 was limited to 3.8 to 6.5 mcs., a companion transmitter and receiver were hurriedly designed in the frequency band of 2.0 to 3.5 mcs., and both of these with a variety of accessory gear were produced and assembled under the nomenclature "Radio Set AN/TRC-2( )." This was in 1944, and the daddy of the ANGRY-9 had its first taste of the jungle.

Need for Compact Radio Set

The mounting evidence of need for a better, more compact and portable general purpose set of this type, with a sufficiently wide frequency band to enable communications in various parts of the world over short distances and over extended distances by sky-wave under all ionospheric conditions, impelled the continuation of development work by the Signal Corps with Rauland. A conference held on June 1, 1944, at the Laboratories, set the stage for development of a replacement for the SCR-694 and the AN/TRC-2. By the end of 1944, the ANGRY-9 had taken shape and production orders placed. The band of 2.0 to 12.0 mcs. was now covered in one case only an inch or two larger than the SCR-694; and greater versatility, especially in the antenna circuit, had been included.

Advanced Design and Adaptability

Because of the stringent requirements for and the demands made by troops whose tactics depended so largely upon communications, and because of the exceptional efforts of the engineers involved in the development work on the SCR-694 and the AN/GRC-9, the ANGRY-9 was far in advance of the general state of the art when it was completed. So far advanced was its design that only with the advent of transistors and printed circuits did the design engineers foresee the achievement of the very substantial improvements in physical or operational characteristics of the ANGRY-9.

That there is a continuing need for such equipment — despite the opening of new frontiers in the frequency spectrum, the enticements of frequency modulation in the very high frequency (VHF) range where room for its bandwidth might be made, and the disadvantages from atmospheric noise and interference that plague the HF band—may be argued from the rest of the story—the part really about the ANGRY-9 itself.

The "work clothes" of the ANGRY-9 may be said to be the dust of deserts, the mud of swamps, the damp of jungles and the ice of polar areas. It has worn all with honor.

In its prototype stage it was tested by: the Airborne Command, Mountain and Winter Warfare Board, Infantry Board, Antiaircraft Board, Coast Artillery Board, Military Police Board, Landing Vehicle Board, U. S. Navy, Office of Strategic Services, and British Signals Research and Development Establishment. It has been installed in jeeps, trucks, cargo carriers and LVT's, carried by men and packed on animals. It will float.

The ANGRY-9 is used extensively in the Army and the Marine Corps. It has been produced not only in the United States but also in France and lately in Germany, to equip the Armies of some of our NATO partners in defense. But it is not only in the military that the set has found favor.

"Angry-9" in Research

When preparations were being made in 1946 for the "*Kon-Tiki*" raft expedition across the South Pacific, a Norwegian Assistant Military Attaché inquired as to what Signal Corps radio communications equipment might be suitable for its purposes. The ANGRY-9 might have served, but it was not then ready to commence its non-military service. (Other Signal Corps equipment was taken on the raft—but that's another story.)

Then, in 1947, the Signal Corps had an opportunity to support an expedition by the University of California to the Union of South Africa for anthropological investigations, and among the several items of signal equipment furnished were two ANGRY-9's for their communications from the camp to their base.

About 1949, another scientific expedition which went by dogsled across ice to a northerly island and stayed during the summer, isolated after the ice break-up, received the ANGRY-9 for communications to its base 200 miles away. One of the party returned to the Office of the Chief Signal Officer to report smilingly that it had been out of communication only one day!

Mountain climbers, too, have wanted the ANGRY-9 for communications between the bases they establish on their routes to earth's highest peaks.

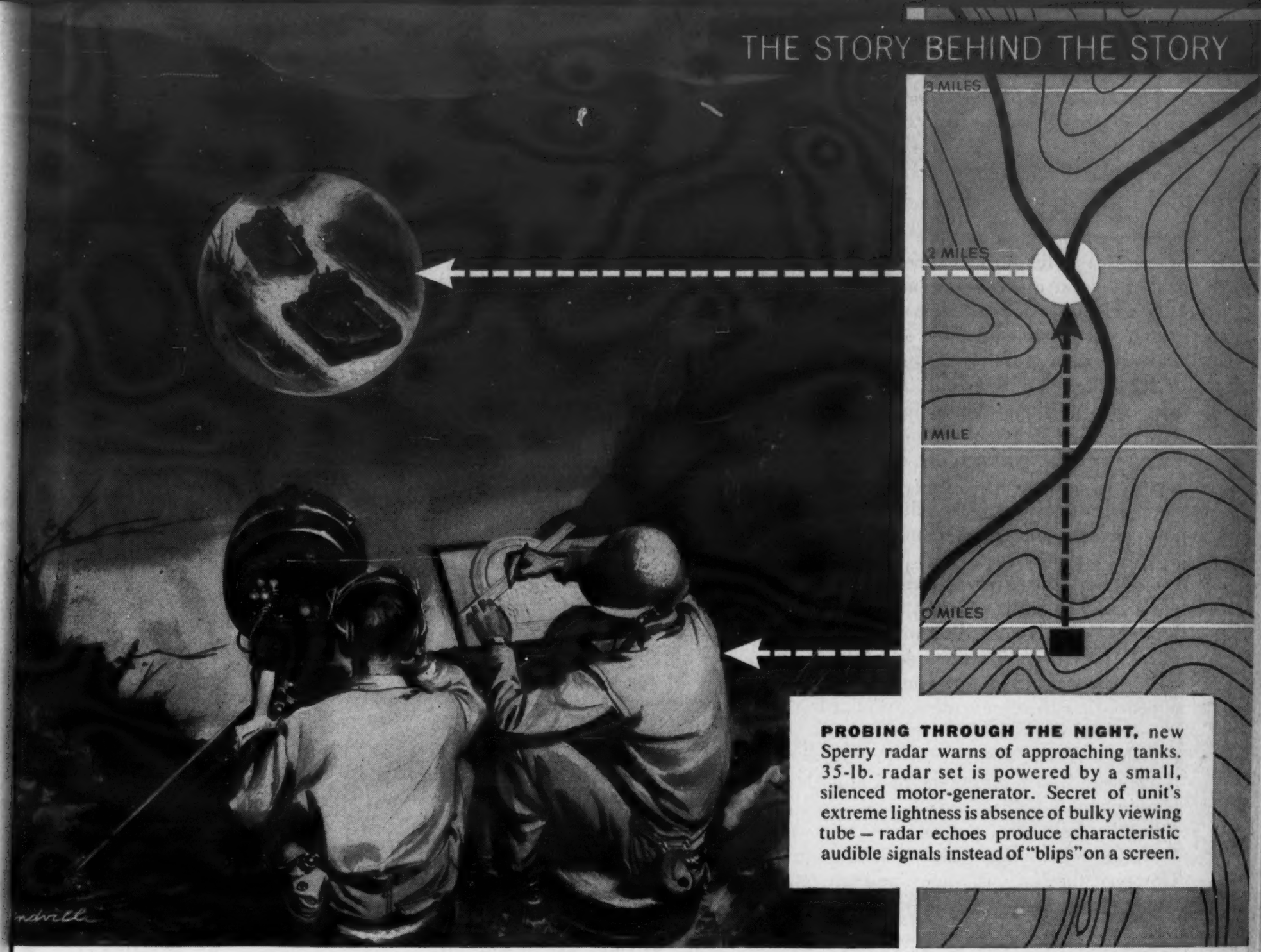
It has been on the South polar expeditions preparing the way for the work of scientists during the coming International Geophysical Year. Agencies of Great Britain and New Zealand have sought out the ANGRY-9 for their activities also in the south polar area during the IGY.

And in December 1955, it was recommended to University of Pennsylvania archeologists for use during their program to reopen, from the jungle of northern Guatemala, the ancient Mayan city of Tikal. The ANGRY-9 may, at this time, have its antenna on a 1000 year old temple in that ancient city!

The job of the ANGRY-9 is to provide communications. For some ten years now, it has carried the voice of military command. It has also carried the voice of science, coordinating its anthropological and archaeological research, and the voice of constructive activities working to increase Earth's resources in the broadest sense.

Value of AN/GRC-9 in War and Peace

Briefly, then, this is part of the story of the ANGRY-9 up to now. This set, in the hands of an operator who knows *his* part of the job, is a means of communication that serves in war and peace, anywhere, anytime, in a way that gives high credit to the military-industry team that designed and produced it, and to those fighting men whose combat needs and experience forced the development and proved, in the fire of warfare, that the highest standards of design are none too good a match for their patriotism and sacrifice.



PROBING THROUGH THE NIGHT, new Sperry radar warns of approaching tanks. 35-lb. radar set is powered by a small, silenced motor-generator. Secret of unit's extreme lightness is absence of bulky viewing tube – radar echoes produce characteristic audible signals instead of "blips" on a screen.

ARMY HAS "SILENT SENTRY" RADAR FOR FRONT-LINE USE

DAYLIGHT VIEW of Sperry radar and forward observation team. Operator (r.) interprets audible radar echoes while second soldier tracks reported movements on plotting board. Unit supplies accurate elevation, azimuth and range data.

Newspaper readers across the country learned recently the good news that Army troops will soon be able to call on the world's smallest radar set to warn of surprise over-the-ground attack by an aggressor. The device greatly enhances the effectiveness of battle area surveillance.

Developed jointly with the Army Signal Corps, this new Sperry portable radar instantly reports any movement of men or vehicles within a 3-mile range—at night, in fog or smoke. So accurate is the set that it detects *one* soldier walking half a mile away, even tells whether a vehicle has wheels or tracks.

This new "Silent Sentry" is one more result of the joint efforts of our military leaders and Sperry to keep our defenses up-to-date. Like the Sperry MPQ-10 Mortar Locator, which tracks enemy shells and computes their origin for instant, accurate counter-fire, or the Sperry flight control systems which enable SAC bombers to fly to pinpoint targets anywhere in the world, it helps preserve peace by deterring aggression.

SPERRY GYROSCOPE COMPANY
Great Neck, New York
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Letters to the Editor

The Editor of Signal is pleased to publish the following extracts from a letter written to the AFCEA by the Honorable Wilber M. Brucker, Secretary of the Army.

"The conditions of future warfare will in all probability render impossible the kind of deliberate mobilization and unhurried training of units which was possible after the outbreak of our former wars.

"Consideration for our national economy precludes the maintenance of a standing Army of sufficient size to meet all of our defense requirements. Consequently, our defense plans in case of war place reliance on the carefully integrated employment of the active Army, the National Guard, and the Army Reserve. All parts must be ready to mesh smoothly and efficiently according to a carefully timed mobilization schedule. Every element of this force must have a peace-time readiness permitting it to meet its schedule for deployment.

"The problem, therefore, is to find a means to insure individual and unit training for mobilization missions in time. In the case of the active Army there is obviously little difficulty. However, the National Guard and the Army Reserve present a different problem.

"The only acceptable solution to this training problem which has thus far been advanced is the one proposed by the Army. This proposal is to require all future enlistees in the National Guard and Army Reserve to take six months active duty training. Six months is by no means an arbitrary figure but was arrived at only after the most detailed analysis of the mobilization requirements of our reserve forces. The six months period is essential to give all soldiers in the reserve components individual training, and some unit training so that they will return to their reserve units in their home areas prepared to fit into the military organization as a useful member of the military team. The local commander will be freed from the present requirement to train individuals in varying stages of basic subjects and can concentrate his efforts on raising the level of unit training to the point required by its mobilization mission.

"Specifically, this program has the following merits. It provides four months basic survival training before being sent overseas. It gives additional time to permit basic unit training. It is the most efficient from the teaching viewpoint. It permits continuity of instruction. It brings a man to top physical condition at the outset to absorb the strenuous training. It assures the effective inoculation of discipline and the personal habits needed in military life. Finally, it obtains the greatest return in terms of effective training from the very substantial investment in money and manpower required to support the reserve program.

"I am aware of the concern expressed by members of the National Guard over the effect of this requirement of six months training on the number of National Guard enlistments.

"Some of the advantages which I propose to give the National Guard are the following:

a. The Army Recruiting Service will use its resources to recruit concurrently for the active Army and the National Guard.

b. The National Guard will be allowed an exclusive period of 60 days to seek recruits among all two-year inductees and enlistees returning from duty in the active Army before the latter are assigned to a U.S. Army Reserve unit. Beginning August 9, 1957, nearly 10,000 per month of these individuals will be available for recruitment.

c. Up to now the six months training program has been available only to young men between the ages of 17-18½. We have recently extended the program to all young men between the ages of 18½ and 26.

"I am considering other possible forms of aid to the National Guard recruitment but consider that the foregoing actions invalidate any grounds for concern that the Army program will work injury to the Guard. Rather, it will strengthen the National Guard and give it the very trained manpower it needs."

Sincerely,

WILBER M. BRUCKER
Secretary of the Army

★ ★ ★

An Invitation

DEAR SIR:

Since returning to Tokyo from attending the Armed Forces Communications and Electronics Association Convention held in Boston in May, 1956, the thought has often occurred to me that occasionally members of the AFCEA stop or pass through Tokyo. In order that in the future it will be possible for such members to meet American and Japanese fellow AFCEA members, my company wishes to inform you that the Overseas Engineering Corporation, Japan Branch, desires to know of any AFCEA member visiting Tokyo.

It is felt that in a strange land where customs and language differences complicate a business mission, my company is in a position to assist AFCEA members and group member companies in making their visits and contacts in Japan more enjoyable and profitable.

Please contact me should the occasion arise of a visit to Tokyo of a representative of your company.

Sincerely,

JAMES J. GREENE
Electronics Division
Overseas Engineering Corp.
Tokyo

★ ★ ★

A Clarification

DEAR SIR:

The article in your issue of October 1956 entitled "ICBM Problems to be Solved by Electronic Brain" stated that the UNIVAC Scientific 1103A was the only machine in the world versatile enough to interrupt one complex problem to solve a new, high priority problem while retaining in its "mind" all work on the first for subsequent solutions.

This, of course, is no more nor less than the "interrupt feature" which is available for both the IBM 704 and the 709, large-scale electronic digital computers. Two 704 systems equipped with the interrupt feature will be in operation by major aircraft companies on the West Coast by next month. One of these will be applied specifically to the ICBM program.

Neither of these customers has as yet released information on its computing installations. We expect that they will in the near future.

We appreciate your interest in clarifying this point. I trust that you will call on us for any material which we can furnish for your magazine.

Cordially,

DANIEL A. SHEPARD
International Business Machines

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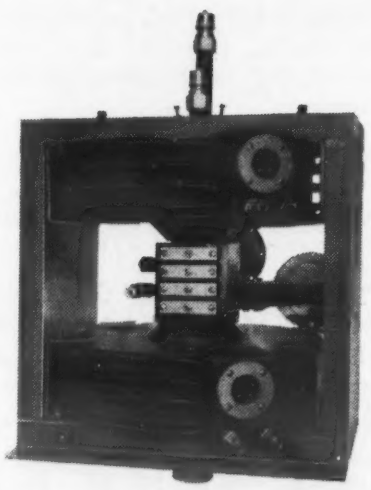
ANOTHER VARIAN FIRST!

2 kW SHF Varian Klystron



The VA-804D (4.85—5.0 kMc) mounted in its focusing magnet, the VA-1504.

The heart of the new Canadian Westinghouse SHF scatter transmitter, now being operated in a "proving ground" circuit between Hamilton and Kinmount, Ontario, is the Varian VA-804 klystron amplifier, designed specifically for forward scatter communication service. The now familiar qualities of all Varian klystrons — remarkable efficiency (see below), economy, reliability, and proved performance — made this tube the logical choice for Westinghouse.

Electrical Characteristics:

Frequency — 4.4 to 5 kMc
Power — 2 kW minimum
Gain — 50 db
Efficiency — 40% nominal

For a complete description of this and other Varian klystrons contact your local Varian Representative or write Varian Associates, Application Engineering Department, Palo Alto, 11, California.

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"Sidewinder" is the Navy's newest air-to-air guided missile. Flight tests have proved the missile to be as vicious as the desert rattlesnake for which it was named.

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Simple in operation, small and light enough to be carried in quantity by single-seat Interceptors, "Sidewinder" can be fired singly or in salvos. It requires no complex launching system or special pilot training, and it maneuvers deftly at supersonic speeds. The missile displays extremely high single-shot accuracy —and even more important, *it can be launched well beyond reach of the target aircraft's defense.*

"Sidewinder" was developed by the Naval Ordnance Test Station of the Navy Bureau of Ordnance at China Lake, California. Philco assisted NOTS in the research and development program, and performed the subsequent engineering required for manufacture of the missile. "Sidewinder" is *now in full production at the Philco Government and Industrial Division.*

Philco is proud to have made this important contribution to the development of more effective electronic systems for our national defense.

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International Resistance Co.
International Telephone & Telegraph Corp.
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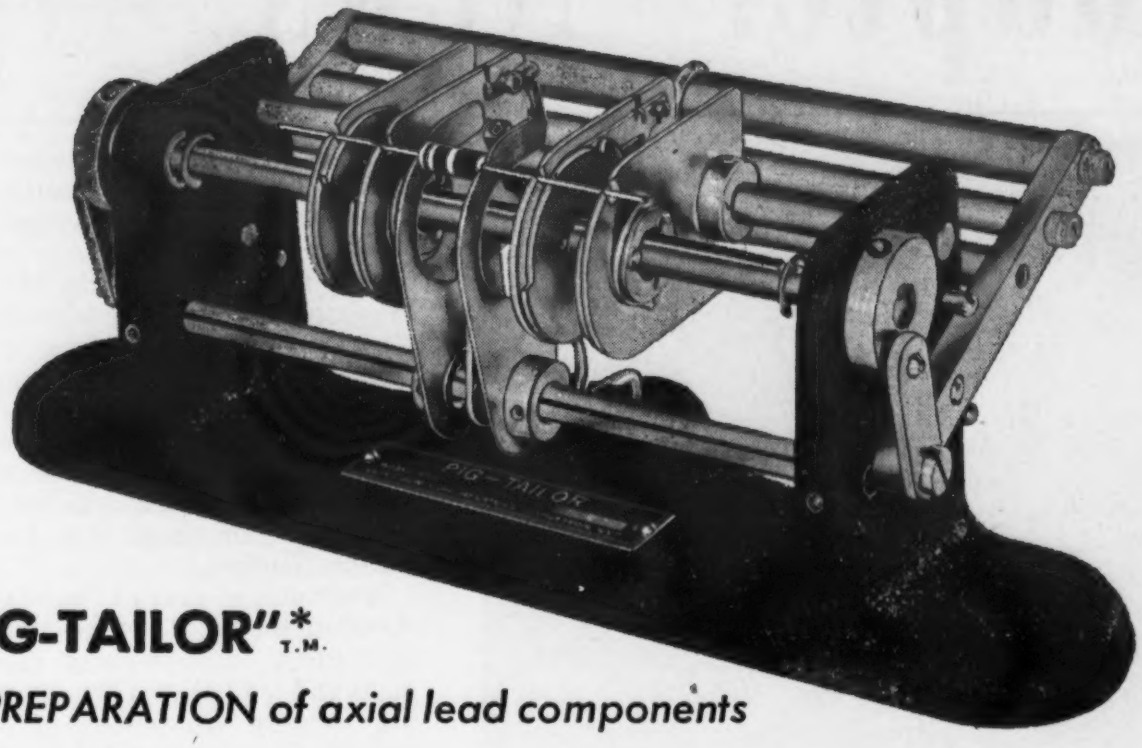
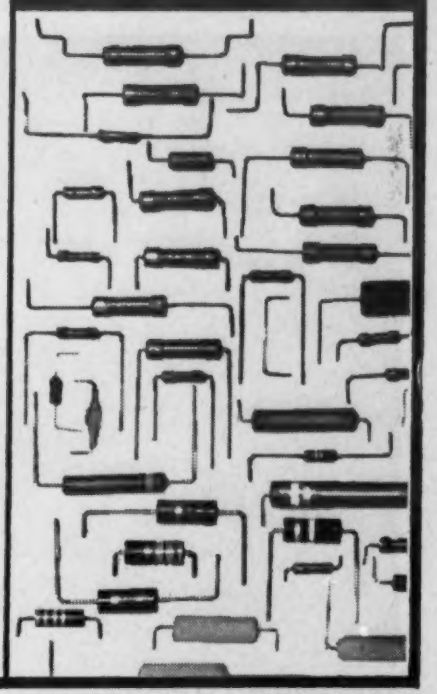


"PIG-TAILOR"* T.M.

For PREPARATION of axial lead components

PREPARED COMPONENTS IN SECONDS WITH THE "PIG-TAILOR"



"PIG-TAILORING"

. . . . a revolutionary new mechanical process for higher production at lower costs. Fastest PREPARATION and ASSEMBLY of Resistors, Capacitors, Diodes and all other axial lead components for TERMINAL BOARDS, PRINTED CIRCUITS and MINIATURIZED ASSEMBLIES.

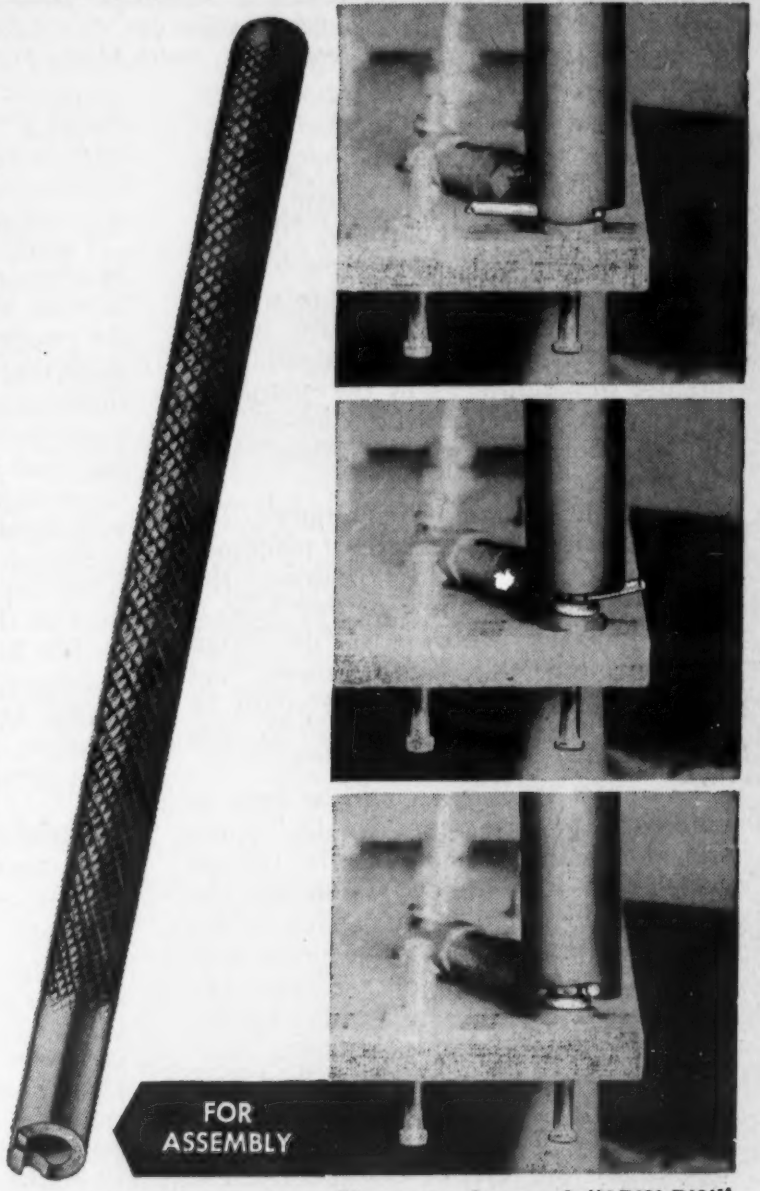
The "PIG-TAILOR" plus "SPIN-PIN"—accurately MEASURES, CUTS, BENDS, EJECTS & ASSEMBLES both leads simultaneously to individual lengths and shapes—3 minute set-up—No accessories—Foot operated—1 hour training time.

PIG-TAILORING provides:

1. Uniform component position.
2. Uniform marking exposure.
3. Miniaturization spacing control.
4. "S" leads for terminals.
5. "U" leads for printed circuits.
6. Individual cut and bend lengths.
7. Better time/rate analysis.
8. Closer cost control.
9. Invaluable labor saving.
10. Immediate cost recovery.

PIG-TAILORING eliminates:

1. Diagonal cutters!
2. Long-nose pliers!
3. Operator judgment!
4. 90% operator training time!
5. Broken components!
6. Broken leads!
7. Short circuits from clippings!
8. 65% chassis handling!
9. Excessive lead tautness!
10. Haphazard assembly methods!



"SPIN-PIN"* T.M. Close-up views of "SPIN-PIN" illustrate fast assembly of tailored-lead wire to terminal.

* PATENT PENDING

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Chapter News

Augusta-Fort Gordon—Inspecting a Television Monitor during a tour of Augusta's Southern Bell Telephone Co. are left to right: Mr. Tom Baker, Mr. J. C. Woodward, both of Bell, and Captain Walter W. Smith of the Signal Training Center.

Arizona

Dr. H. R. J. Grosch of the Computer Department of General Electric, Phoenix, addressed the February 7th dinner-meeting which was attended by some 150 members and guests. Dr. Grosch's topic was "Sex Life of an Electronic Computer," and dealt with the use of computers in the computer industry in the following phases: designing, manufacturing, selling and maintenance.

In the designing of computers, Dr. Grosch said that existing machines could be utilized to "improve the breed" by asking the machine how it could improve itself. Also he stated that through this same process the machine's technical language could be simplified in order to make its use easier.

Computer machines could be built in automatic factories that would be designed by other machines. Dr. Grosch added that it is quite possible for the mountain of paper work needed in the manufacturing process to be taken over by electronic computers, replacing the hundreds of people now needed for the ordinary processes of purchasing, storing and assembling of parts and supplies.

Even the selling process could be helped by the use of computers. For example, Dr. Grosch suggested that prospective customers' likes and dislikes in computer machines could be analyzed in an electronic computer to find out what features would sell best.

Maintenance, which is an increasingly important aspect in the use of computers, would be made easier by having the machines diagnose their own ills to tell the repair technicians what is wrong with the maze of wiring inside them. Today's use of miniaturized tubes and electronic components makes it very difficult to service these electronic marvels.

Finally, Dr. Grosch cited some of the benefits of using electronic computers instead of human beings for much of the work of the business world. He said that computers can work faster than people, work more accurately, do more work in a day, and, after the initial cost of the computer is absorbed, do work much cheaper than is possible with humans on pencil and paper.

Presiding at the meeting was Colonel Kirk Buchak's last official act as president of the chapter. The following day he left for Fort McPherson for his new assignment as Signal Officer of the Third Army, Vice president Arthur H. Mudgett will act as president until the next election of chapter officers.

Augusta-Fort Gordon

A tour of the Southern Bell Telephone and Telegraph Company in Augusta highlighted the February chapter program which was followed by a dinner and business meeting at Timmerman's Restaurant.

Personnel of the Signal Training Center at Fort Gordon and chapter members and guests were shown such points of interest as the long-distance switchboard, the power room, a coaxial television monitor, and other facilities of the telephone company.

Southern Bell representatives who arranged the program were E. H. Gibson, district manager; Tom Baker, Edward Breedlove, W. R. Christian and G. W. Simms.

Baltimore

"Communications in Fire Fighting" was the theme of the January meeting which was held at the Baltimore County Fire Department headquarters. Chief Anthony P. Orban was host for the occasion.

The following officials of the Fire Department were introduced and explained the duties of their various departments and the techniques employed: Deputy Chief F. Lee Cockey, Fire Prevention Chief Louis Maisel, Chief Winfield Wineholt of the Training Center, Chief Paul Miller in charge of the Repair Shop, and Arson Chief Nelson Williams.

A conducted tour of the headquarters revealed the most modern fire fighting equipment. The two-way radio equipment and map viewer permit any mobile fire fighting equipment to be "dead-reckoned" or promptly directed to a fire anywhere in Baltimore County. Headquarters follows the equipment visually and is in continuous contact with the crew.

Following the tour, there was an actual fire fighting demonstration showing modern techniques of fire fighting and rescue.

Decatur

The annual election of officers was the main item of business at the January 22nd meeting, with Robert M. Burns (Major, USAR), of B. B. Burns Co., Inc., chosen as the new president.

Other officers selected were: vice-presidents—Adolph M. Hetzler and Maj. Edward I. Melton; secretary-treasurer—Capt. Walter L. Beddingfield; member Executive Committee—Lt. Col. Fred J. Hays, past president; board of directors—Jack Hathaway, Fred Zickuhr, Merle Morrison and Doyle McCord. These officers are all from the Decatur Signal Depot.

The program session consisted of three films—"Quality Control in Photographic Lenses," "The Sound and the Story" and "The Story of Television."

Chicago

Allied Radio Corporation was host to 200 chapter members and guests on January 31st.

Featured speakers were J. Lewis Powell, Office of the Assistant Secretary of Defense, Washington, and George Hale, Deputy Director, Small Business Administration, Chicago.

The meeting was followed by a tour of Allied's newly expanded facilities which were of particular interest to supply personnel. (Photo page 37)

Fort Monmouth

Michael E. McCabe, public relations official of the New Jersey Bell Telephone Company, presented a lecture-demonstration on the many uses of the transistor, "The Mighty Midget," at

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the chapter's February meeting.

Gibbs Hall Officers' Club was the scene of the dinner and the program, with several hundred members and guests in attendance.

Hawaii

Recent activities of the chapter consisted of a dinner-dance at the Cannon Club, Fort Ruger and a luncheon-meeting at which the Hawaiian Telephone Company presented a program on "Continuous Flow Dry Air Pressure Systems."

At a meeting of the Board of Directors on January 22nd, the following were appointed to offices vacated because of transfers: Lt. Col. Wayne L. O'Hern, USAF, became First Vice President to succeed Lt. Col. Michael F. Killian; and Mary Evans, Naval Communications Station, was chosen Treasurer to replace Ira Mercer.

Kansas City

Robert B. Alexander, Assistant Project Manager, Engineering, Western Electric Company, New York, presented an up-to-date report on the DEW Line project at the chapter's January 31st dinner-meeting.

Following his address, Mr. Alexander showed a color film depicting some very unusual scenes of the terrain encountered as well as some of the unique construction methods employed in the completion of the project. The program was interspersed with personal interest anecdotes which were entertaining as well as interesting.

Some 120 members and guests attended, and the chapter reported the event as "one of the most instructive and entertaining meetings it has had in a long time."

Keflavik

A color slide presentation and a talk on "Scenery of Iceland" was the program feature of the chapter's February 13th meeting. Lt. Col. Giesen, Corps of Engineers, conducted the program and the chapter reported that "his photographic skill and excellent knowledge of Iceland did much to dispel the idea that Iceland is a bleak wasteland."

New chapter officers were elected as follows: president—Maj. John D. Lynch, Commander, 1971st AACS Squadron; vice-president—T/Sgt. F. A. Antonaccio, 1971st AACS Squadron; secretary—T/Sgt. D. P. Hall, 1971st AACS Squadron; treasurer—Capt. William A. Elbracht, ADFCE IADF.

Nagoya

Sixty officers and civilians from the Nagoya area, representing the entire communications field, attended the chapter's first meeting of 1957, held on February 25th.

Highlight of the luncheon meeting at Moriyama Air Station was the presentation of the official chapter charter. Col. Steve J. Gadler, chapter president and Director of Communications-Operations at Fifth Air Force Headquarters, accepted the charter from the chapter secretary, Craig D. Elderkin, RCA supervisor. (Photo page 39)

During the business session, plans were made for future activities and a membership drive was set in operation.

New York

"Techniques of Color TV Productions" was the subject of the February 27th dinner-meeting at the Belmont-Plaza Hotel. Mr. Reid R. Davis, Manager of TV Technical Operations of the National Broadcasting Company, presented the program and discussed the many factors encountered in producing a TV show in color.

Mr. Davis also illustrated the equipment used in color television, the lighting required, the problems that settings introduce, as well as other related matters such as colors used in costumes and the complications of effective make-up. At the conclusion of his presentation, Mr. Davis conducted a question and answer period.

North Carolina

The annual election of officers was held on February 6th with the following results:

President—Lt. Col. Cuggie E. Kyzer, Post Signal Officer, Fort Bragg; vice presidents—James R. Fowler, Carolina Telephone and Telegraph Co., Fayetteville; John E. Johnston, American Telephone and Telegraph Co., Charlotte; and Lt. Col. Fred W. Hemmrich, 82nd Airborne Signal Co., Fort Bragg; treasurer—T. P. Williamson, Carolina Telephone & Telegraph Co., Fayetteville; secretary—Maj. F. G. Sheviak, USA Airborne & Electronics Board, Fort Bragg.

National Council members: Luke W. Hill, Carolina Telephone and Telegraph Co., Tarboro; and Col. Henry J. Hort, 1st Logistic Command, Fort Bragg. Director: Dan J. Lawson, Southern Bell Telephone and Telegraph Co., Charlotte.

Northeastern University

New officers of the two divisions of the student chapter are:

Division A: president—Wilfred Picard; vice president—William C. Regan, Jr.; secretary—Thomas R. King, Jr.; treasurer—Edward O'Keefe.

Division B: president—Neal Atkinson; vice president—Peter Lanzilotti; secretary—Jason Brooks; treasurer—Harry F. Giberson.

The schedule of activities for the winter term (Division A in school) were as follows: January 30—movie, "Origin of the Motion Picture"; February 6—double feature movie, "Research and Development" and "Weapons of Artillery"; February 13—speaker from Hi-Fi Labs; February 20—movie, "Challenge of Outer Space"; March 6—movie, "Role of the Combat Cameraman"; March 13—speaker on underwater photography and movie on the atomic cannon; March 20—movie, "The Steel Ring" (Nike around America); March 27—business session to plan participation in AFCEA national convention.

In addition to these activities, the electronics and photo groups of the chapter met regularly for furtherance of their projects. Also, chapter members were invited to participate in the MARS program to secure ham licenses.

(*Continued on page* 39)

Chicago—Close to 200 members attended the January meeting of the chapter which was held at Allied Radio Corp.

Radio Telescope at Harvard University's Agassiz Station Observatory.

Banks of Hycon Filters . . . Section of Radio Telescope Receiver designed and built by Ewen Knight Corporation.

Simultaneous detection of 20 signals from neutral hydrogen . . .

another problem solved by HYCON FILTERS

Extending man's view into the depths of the universe is a giant new Radio Telescope at Harvard University's Agassiz Station Observatory. Astronomers are reconstructing the spiral structure of our Milky Way by measuring Doppler Shift of radio signals originating from neutral hydrogen.

ELECTRICAL SPECIFICATIONS - NARROW BAND SERIES

Frequency range: 10 Kc - 30 Mc

Relative Bandwidth: .02% to .5% of center freq.

	Type 11	*Type 22*	*Type 44*
Shape Factor:	8	3	1.8

Playing a vital role in the Radio Telescope Receiver which makes these measurements possible are Crystal Filters designed and manufactured by Hycon Eastern. Hycon Filters were selected for their accuracy, stability and selectivity. Spaced at 100 Kc intervals from 5.5 Mc to 9.5 Mc, these Type 11 Filters from Hycon's Narrow Band Series have a 3 db bandwidth of 5 Kc and insertion loss of less than 3 db.

Hycon Eastern is currently producing Crystal Filters in the 10 Kc to 30 Mc range. Because they make possible a reduction in the number of conversions, Hycon Filters are finding wide application in mobile and fixed radio receivers and transmitters.

Write for Crystal Filter Bulletin.

HYCON EASTERN, INC.

75 Cambridge Parkway, Dept. G-4, Cambridge 42, Mass.

Affiliated with HYCON MFG. COMPANY, Pasadena, California

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Nagoya—The presentation of the Chapter's Charter was made at the February meeting. Left to right: Lt. Col. Harry C. Ross, vice-pres.; Craig D. Elderkin, RCA Field Manager and sec.; Col. Steve J. Gadler, pres.; Col. Robert W. Dickerson, vice-pres.

Signal Corps officers who serve as faculty advisors to the chapter are: Major Fred J. Frank, Major James J. McKenna, Captain Frank D. Stevens and Captain Charles P. Skinner.

Rome-Utica

Col. George M. Knauf, commander of the 2845th Air Force Hospital, Griffiss Air Force Base, discussed "Medical Electronics" at the chapter's February 27th meeting. Fifty members and guests heard Colonel Knauf stress the importance of the union between medicine and electronics in order to advance the medical and electronics frontiers.

A tour of part of the hospital preceded the program. Richard C. Benoit, Jr., chief of the Direction Finding and Telecommunications branch of the Directorate of Communications, RADC, was chairman for the occasion.

Colonel Knauf stated that many known fundamental electronic phenomena and laws are analogous to the functions of the human body, and that these laws of the more advanced forms may explain the excellent sonar capabilities of the bat and the homing capabilities of the lunar moth.

He further pointed out that in the laboratory man is attempting to build devices to compress data and develop computers which at best fall far short of the capabilities of the human body. As examples, he cited machines which compress data by electronic means by a factor of six, compared to the human eye which can compress material to a ratio of 25 or more to one in an extremely small space. He also stated that the brain is one of the most efficient computers and storage devices known to man and that it has a retention capability far in excess of any man-made machine regardless of size. Physiological processes are typical of goals scientists hope to achieve in the laboratory, he pointed out.

The Air Force doctor outlined the efforts being made by the Air Force in a program of medical research to better understand the effects of micro-wave energy on the human mechanism. At the present time, knowledge is short of factual data and he said it is felt that the program being pursued at Griffiss AFB will supply answers to many existing problems.

At the close of the meeting, the group was given an opportunity to observe the operation of the electronic oven which is used in hospitals to prepare special diets.

Scott-St. Louis

"Our Mr. Sun," the first in the Bell System's new series of color film programs on science, was presented at the February 1st dinner-meeting at Augustine's Restaurant in Belleville. Approximately 100 members and guests were in attendance.

The chapter reported (as did other AFCEA chapters who used this same program) that the film was a remark-

Fort Monmouth—Shown at the Chapter's January meeting are from left: Brig. Gen. Earle F. Cook, Commander, Army Signal Engineering Labs; Col. Olin L. Bell, president of the chapter; Michael McCabe, New Jersey Bell Telephone Co. official and guest speaker, and Brig. Gen. S. S. Hoff, Commandant of the Signal School.

HYCON FILTER APPLICATIONS ARE MANY . . .

Whether tracking signals from outer space or dispatching a fleet of radio equipped taxicabs, Hycon Filters are finding wide application in many of today's advanced receiver installations. Listed herewith are a number of users of Hycon Filters. It will pay you to investigate how Hycon Filters can help solve your selectivity problems.

A C The Electronics Division
General Motors Corporation
Air Force Cambridge Research Center
Allen B. DuMont Laboratories, Inc.
American Radio Relay League
Applied Physics Laboratory
The Johns Hopkins University
Bell Telephone Laboratories, Inc.
Canadian Marconi Company
Collins Radio Company
Crosley Division
Avco Manufacturing Corporation
Ewen Knight Corporation
Fada Radio & Electric Co., Inc.
Federal Telecommunication Labs.
General Electric Company
General Precision Laboratory, Inc.
Gilfillan Brothers, Inc.
Hughes Aircraft Company
Kahn Research Laboratories
Laboratory For Electronics, Inc.
Laboratory Procurement Office
The Army Signal Supply Agency
Lear, Inc.
Massachusetts Institute of Technology
Lincoln Laboratory
Motorola, Inc.
National Bureau of Standards
National Company, Inc.
Naval Research Laboratory
Philco Corporation
Pye Ltd. . . . Cambridge, England
Radio Corporation of America
Radio Engineering Laboratories, Inc.
The Ramo-Wooldridge Corporation
Raytheon Manufacturing Company
Siemens New York Incorporated
Stromberg-Carlson Company
Sylvania Electric Products Company
University of Colorado
Westinghouse Electric Corporation
Wilcox Electric Company, Inc.

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able production and that it was received with great interest and enthusiasm. Edward H. Gray, office of the Defense Activities Engineer, Southwestern Bell Telephone Company, introduced the program.

South Texas

Dr. Hubertus Strughold, head of the Department of Space Medicine at the Air Force School of Aviation Medicine, addressed the chapter on February 26th.

The dinner-meeting was held at Randolph Field Officers' Club, with 100 members and guests in attendance. Among those present was Major General Gordon A. Blake, AFCEA national director, who had recently taken over his new assignment as commander of the Air Force Security Service in San Antonio.

Dr. Strughold, who is the author of "The Green and Red Planet; A Physiological Study of the Possibility of Life on Mars," and more than 150 professional papers on aspects of physiology, aviation medicine, and space medicine, discussed the subject of space medicine in general and, in particular, touched on some of the problems involved in maintaining existence aboard a space ship in interplanetary travel.

Southern California

Brigadier General Milton W. Arnold, Vice President, Air Transport Association, was guest speaker at the chapter's February 18th meeting. His topic was "Traffic Control in the Jet Age."

Discussing operational efficiency and safety of aviation, General Arnold pointed out that traffic control in any age depends upon the proper balance of airplanes, airports and electronics. He gave the audience a "quick look at the facts and stark reality as effecting the utilization of electronics" as follows:

"The use of the airspace is growing by leaps and bounds. Military aviation will continue to grow in numbers and the utilization will increase slightly up to 1965. Airline operations will continue to grow 1 to 3% per year through 1965 due to the introduction of faster equipment, although the number of airline aircraft will remain almost static through 1965, except for the good possibility of a greatly increased number of aircraft operated by the local service airlines.

"What is possible and what is new in the field of electronics up to 1963? Certainly there are new gadgets or devices and improvements in the old ones, but there is nothing to replace our basic tools prior to 1963. We will continue to utilize voice communications enroute and in the high density traffic areas, and radar in the high density areas for expediting traffic, with some improvement in capacity through the limited introduction of computers by 1960 to 1963. This improvement will quickly be absorbed by the increased demand. . . . radar has the capability of vastly increasing the capacity of our system prior to 1963 or 1965 provided aviation has a universal airborne beacon or transponder to work with military and CAA ground radar.

"Today it appears aviation is further away from attaining the goal than we were two years ago. The difficulties lie not in the technical field but in the operational use of frequencies. The operational use of the transponder was clearly defined as early as 1948. There are several technically satisfactory transponders on the market today. Without the transponder, we are tending to oversell the use of radar enroute. Radar in the high density areas for approach and departure does a magnificent job and will continue to do an ever-increasing safe and efficient job with the introduction of electronic times, and further improvement in circular polarization, even with our inherent limitations and saturation of the use of voice communications. All of us have been doing wishful thinking on the degree of improvement through the use of more and more radar enroute without a beacon. The enroute problem is the bottleneck of the system and will continue to restrict the capacity until 1965, at which time I expect data link or telemetering to solve the problem of enroute separation."

Southern Connecticut—Newly elected officers for 1957 are left to right: Bernard Rosenberg, chapter treas.; E. P. Hurley, pres. elect; I. T. Shapiro, chapter sec.; Col. R. B. Tomlinson, FESA; John N. Higgins, vice-pres.; Lincoln Thompson, retiring pres.; R. E. Nelson, vice pres.; Charles Ecklund, vice-pres. elect, and S. Montgomery, vice-pres.

Southern Connecticut

The recent transfer of the chapter secretary, I. T. Shapiro, to Philadelphia necessitated the appointment of a successor. Joseph A. Leopold of the Dictaphone Corporation was selected to fill this post.

Named to the board of directors in the recent annual election were: T. H. Beard, Dictaphone Corp.; J. B. Cook, Whitney Blake Co.; Charles Ecklund, Dictaphone Corp.; John N. Higgins, KIP Electronics Corp.; Edwin P. Hurley, Southern New England Telephone Co.; Edgar L. Love, Whitney Blake Co.; Spencer Montgomery, Sr. and Spencer Montgomery, Jr., of the Montgomery Co.; Rodney E. Nelson, Machlett Laboratories, Inc.; H. S. Servais, Soundscriber Corp.; Kurt Steinitz, Kay-EssCo; Lincoln Thompson, Raymond Engineering Corp.; W. W. Wrenn, Southern New England Telephone Co.; and Bernard Rosenberg, Army Signal Supply Agency.

Committee chairmen have been appointed as follows: membership—Bernard Rosenberg; publicity—William Shaw, Southern New England Telephone; program—John N. Higgins; civil defense—Sidney Rosenberg, Samarius Electronic Corp.

Rome-Utica—Explaining the electronic oven is Col. George M. Knauf, third from the left. Looking on are, from left, Maj. Stanley J. Wisniewski, RADC; D. S. Kirby, chapter sec.; Col. William S. Heavner, R & D; Richard C. Benoit Jr., chairman of the day, and Harold J. Crowley, who arranged the affair.

Tinker-Oklahoma City

Perry A. Norman, Southwest Division Manager of private wire service for Western Union Telegraph Company at Dallas, gave a complete up-to-date story on "Modern Facsimile" at the February 21st dinner-meeting.

He illustrated the importance of this communication technique with color slides, sample messages and pictures. He also had some newly developed samples of facsimile paper, and gave interesting inside facts on how facsimile messages and pictures are sent.

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CHAPTER NEWS

A veteran telegraph man with thirty years' experience, Mr. Norman presented an authoritative talk and demonstration. A member of the North Texas Chapter, of which he had been secretary-treasurer, he also reported on AFCEA activities in that area.

Washington

The chapter's February 7th luncheon-meeting at the Willard Hotel was addressed by Rear Admiral Roy A. Gano, Deputy Commander and Chief of Staff, Military Sea Transportation Service.

Admiral Gano described and illustrated with colored films many of the

Washington—Rear Admiral Roy A. Gano, Deputy Commander and Chief of Staff, Military Sea Transportation Service, is seen here addressing the chapter's February meeting.

unusual and sometimes hazardous problems of logistics confronting the Military Sea Transportation Service in supplying and transporting the Armed Forces in many areas throughout the world, including the Arctic and Antarctic, and in moving displaced peoples.

Other guests at the head table were: Congressman Clifford McIntire of Maine; Rear Adm. T. Burrowes, Director (Logistics Plans) OCNO; Rear Adm. H. C. Bruton, Director, Naval Communications Division, OCNO; Capt. W. I. Bull, Asst. Chief of Electronics, Bureau of Ships; Capt. W. S. Butts, ACNO (Fleet Operations) OPNAV; Rear Adm. M. V. O'Regan, ACNO (Logistics); Maj. Gen. A. H. Johnson, Deputy Director, Joint Logistics Plans Group (SECDEF); Capt. G. L. Caswell, Asst. Director, Naval Communications Division (CNO); Capt. J. S. Dorsey, Head, Shore Systems Branch (OPNAV); Capt. F. K. B. Wheeler, Director, Electronics Ship Division, Bureau of Ships; and Lt. Comdr. E. R. Hubenette, Aide to Admiral Gano.

Texas Instruments transistorized timing devices offer new highs in timing / reliability / application

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Already in production, TI transistorized timers are blazing new trails in applications and in performance . . . with extraordinary accuracies and with interval variations to infinity . . . improvements never before practical because of size, weight, power drain, and maintenance limitations.

Designed for repetitive or continuous sequential timing or programming, these lightweight, dependable timers are now in production at Texas Instruments for use in camera timing, flare dropping, bomb release, mine laying, and sonobuoy placement. These are just a few of many potential uses. And, since modification engineering only is required, these remarkable TI timers can be built to *your* specifications within reasonable lead-time. Contact Apparatus division . . .

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NEW PRODUCTS FROM INDUSTRY

Portable Electronic Fish Finder

For the fisherman who wants to insure his luck, the Radio Corporation of America has unveiled a handy portable device which does the next best thing to putting fish on the hook —it finds them electronically.

Designed to ferret out sardines to whales, in depths of 18 inches to 500 feet, the RCA portable electronic fish finder instantly notifies the man behind the hook about schools of fish or a single truant, identifies the unsuspecting fish by size and type, and indicates the most likely spot to dangle the bait.

Technically, the portable fish finder uses a portable indicator scope and a hull-mounted transmitter-receiver unit to provide the fisherman with a continuous picture of fish activity under the keel. It does it with sound-short, focused, ultrasound impulses transmitted downward through the water. Fish which interrupt the sound waves are projected as distinctive "blips" on the indicator scope, and a practiced eye soon identifies a tuna "blip" from haddock or cod "blips."

The fish's exact location and depth are projected on the indicator, after lightning-fast electronic computation of the time it takes the transmitted ultrasound wave to strike the fish and bounce back to the transceiver unit.

The indicator unit measures less than a foot square, weighs approximately 26 pounds, and may be obtained handle-equipped to enable the user to wander the length of his rowboat or yacht.

Remote Safety Monitor System

For personnel safety in hot labs, hospitals, reactor installations, or wherever radio-isotopes are used, the Universal Atomics Corp. of New York City has developed a compact, multichannel radiation monitor system.

The unit is ideal for area and background monitoring for personnel protection, exposure and health monitoring, film exposure determination in industrial radiography, water supplies, water sewerage, and stack monitoring.

The basic unit, Model UAC 450, is a five-channel master console type remote monitor located at a central control station, and can be used to monitor radiation up to several thousand feet away in each of five different locations. Each channel is independent of the others and is connected to an automatic alarm, thereby eliminating the necessity for anyone to watch the meter.

A wide variety of UAC-GM probes and scintillation detectors are used, including specially designed Alpha, Beta, Gamma, and neutron detectors.

Portable Blueprint Machine

A newly developed portable blueprint machine manufactured by Product Engineering Labs Co., Inc. of Newark, New Jersey, is light and compact enough to be carried. Weighing only 5½ lbs., and measuring only 18 x 9½ x 4 inches, the new PELprinter "60" contains its own luggage-type, unbreakable carrying case.

It operates on a dry vapor process and reproduces any type of drawing or written matter up to 8½ x 14 in. Operating time is less than 1½ minutes and the cost approximately 1¢ per copy sheet.

The PELprinter "60" needs only a 110v outlet and is easily adapted for use in automobiles.

Portable Public Address

A transistorized, completely portable public address system that requires no external power source and weighs only 18 lbs. has been made available by the Antrex Corp. of Chicago, Ill.

The unit—called "REDCAP"—is built into an attaché case about 6 inches wide, 14 inches deep and 18 inches long with a self-contained microphone to be used either in hand, or stand-mounted. It is convenient for use at sporting events, sales meetings, conventions, and banquets as it adjusts itself easily for functions indoors and outdoors.

Components include a high fidelity transistor amplifier, a heavy-duty eight-inch speaker, a microphone and controls, and two flashlight batteries. All of its power is drawn from two batteries and thus is ready for instant use anywhere without electrical connections. Batteries are easily replaceable and give up to 50 hours of service.

The transistor amplifier has a frequency response from 50 to 15,000 cycles per second, assuring distortion-free sound reproduction throughout the range of audibility. Sufficient volume can be heard over an area of 6,000 sq. ft. without auxiliary speakers.

TV for the Aircraft Industry

Philco Corp., Philadelphia, Pa., has developed a complete new line of closed circuit television equipment for the aircraft industry. It contains all of the latest developments in cameras, monitors, controls, lenses and other accessories that are required to create camera chains for any purpose.

Featured are fully remote camera controls for the adjustment of focus, for iris apertures and for both high and low speed tilt and pan. Outstanding developments include special weather-proof and explosion-resistant housings as well as a new four lens camera turret.

Closed circuit television has many uses at airfields such as traffic control, runway surveillance, the observation of hidden areas and the remote reading of radar scopes and other instruments. Where distant or inaccessible areas or operations must be kept under observation in aircraft manufacturing and other industrial plants, it has been found indispensable.

New Ear Protector

A new "noise-barrier" ear protector, the smallest, lightest, and most flexible of its type, will enable ground crews to work around jet engine aircraft without danger of hearing loss or ear damage.

This protection has been developed by the Radio Corporation of America to meet a need for more effective and comfortable ear protection for ground crews and maintenance personnel at military and commercial airfields, particularly those with jet aircraft.

The RCA ear protector resembles a set of ear phones, weighs less than 10 ounces and exerts only moderate pressure on the head. Despite the ultra-light weight and pressure, the protector remains "sealed" to the head by automatically adjusting according to working position and movements.

In its design it combines fluid-filled sealing pads and a self-adjustment feature to provide virtually universal fit and maximum noise-shunting protection.

(*Continued on page* 44)

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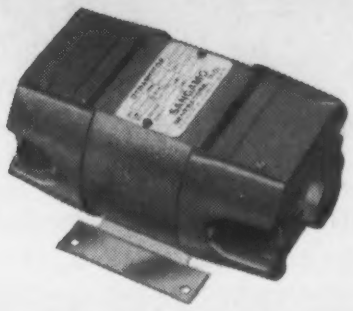
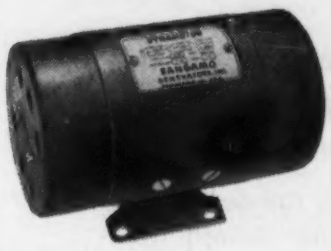


Photo at right shows operators inserting secondary coils and connecting leads to commutators for units like the compact Sangamo "GY" Flatpak—a rugged, small size dynamotor for mobile radio use.

Final assembly operation. Push line type of operations contribute substantially to overall efficiency and accelerated production . . . aids in fulfilling all delivery schedules, even for units like the Type SF below, which are built to the most exacting specifications.



Now...dependable power supply units on dependable delivery schedules

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Sangamo power supply units for the military and commercial fields—Dynamotors, Rotary Converters, Generators, Special DC Motors—are built to meet your most exacting specifications for quality and performance.

And . . . Sangamo has the facilities to insure prompt, efficient, volume delivery to meet *your* production schedules.

A new 200,000 square foot "controlled conditions" plant, in Pickens, South Carolina is equipped with the newest, most modern equipment to utilize the latest production techniques in the manufacture of these power supply units. This plant is geared for full-capacity production for units and components for mobile communication equipment. Look to Sangamo for your requirements.

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NEW PRODUCTS

Cushioned Phono Slide

A newly developed cushion mounted phono slide, which eliminates acoustical feedback in hi-fi systems where speakers are located near record players, has been made available by the Sherry Co., Mamaroneck, New York.

The new development makes it feasible to place the speaker system in the same cabinet enclosure with the other components of the system.

The unique design of the phono slide provides an absolutely smooth glide. Such smoothness is added by the spring which is mounted on nylon rollers for the drawer slides to ride on, thus allowing minimum effort to operate the drawer.

New Intercom Wireless

A new 6-station selective wireless intercom system designed to operate on any one of six channels without interference with other communication within the system has been announced by the Talk-A-Talk Phone Co., Chicago, Ill.

Selective wireless staff stations and selective paging with reply are featured in the new model. The wireless staffs are designed to operate in combination with the Talk-A-Phone selective wireless masters, and can be used separately as well as in groups of stations to provide individual wireless systems. Individual systems can be used in the same area on the same transformer without interference. Calls placed by masters to paging channels will be received simultaneously at all wireless staffs operating on the channel called.

Wireless staffs are designed to operate with the new Talk-A-Phone LCM-8806 selective wireless master and purportedly provide the only selective wireless system available. Selective communication, conference calls, paging and the exclusive "Sonic Gate" circuit are offered under this system.

Additional units are adaptable since the units plug into the conventional electric outlet and no preparatory installation is necessary.

New Photographic Process

A new physical system of photography called the Kalvar Process has been demonstrated in Boston by the American Research and Development Corp. Major advantages of the process are the elimination of all chemicals and the time normally required for development, fixation, washing and drying of conventional processes, superior storage permanence and simplicity of use. These films are not sensitive to ionizing radiation so that, under conditions of atomic bomb fall out, this would be the only photographic system remaining in operation.

The process involves photographic production of light scattering centers in its surface structure, rather than light absorbing grains, enabling Kalvar photographic materials to be used in all photographic applications where high light sensitivity is not required. It should be of special interest to the newspaper industry, where a variety of applications in photo composing and proofing is necessary.

New Double-Pole Switch

Mechanical and electrical functions are completely separated in a radically new type of double-pole switch developed by the Tait Manufacturing Co. of Dayton, Ohio. The principal feature is that the parts necessary to the mechanical operation of the switch, including the spring, do not carry electric current. A division inside the switch case made of non-conducting, non-absorbent plastic material separates the mechanical (upper) part of the switch from the electrical (lower) part.

Reportedly the dangers resulting from loss of tension and failure in the spring due to overheating and metal fatigue have been eliminated.

The switch is a lever-actuated, double pole, single-throw, normally closed type. Contact points are heavy silver and are self-cleaning. The electrical conductor is made of beryllium; copper and steel parts are cadmium plated to resist moisture.

Flaws Detected in Metal

Immunol 438, a new, low cost, U.S. Government approved material, for aqueous phase magnetic particle inspection of metal to detect flaws, has been developed recently by Harry Miller Corp., Philadelphia, Pa.

By replacing kerosene and mineral spirits, Immunol 438 prevents rusting and obtains a better definition of flaw. In addition, the product is non-flammable, odorless, self-cleaning, and economical.

Composition includes one part Immunol 438 to seventeen parts water and this mixture suspends uniformly either fluorescent or non-fluorescent paste.

(*Continued on page* 46)

UMI

WHICH OF THESE JOBS CAN YOU FILL?

	COMPUTER AND CONTROL ENGINEERING	MISSILE GUIDANCE ENGINEERING

ELECTRICAL AND ELECTRONIC ENGINEERS with 2 or more years experience in:	• Gyro Development
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	• Analog Computers
	• Military Specifications
	• Electronic Circuitry
	• Magnetic and Transistor Amplifiers
	• Network Design
	• Inverters
	• AC and DC Servo Motors
	• Electronic Research
	• Fire Control Systems
	• Microwaves and Radar
	  • Antennas
	  • Beacons
	  • Receivers
	  • Transmitters
	  • Pulse Circuits
	• Digital Computers and Data Processing
		• Gyro Development
		• Servo-mechanisms and Feedback Systems
		• Analog Computers
		• Military Specifications
		• Electronic Circuitry
		• Magnetic and Transistor Amplifiers
		• Network Design
		• Inverters
		• AC and DC Servo Motors
		• Electronic Research
		• Missile Control Systems

MECHANICAL ENGINEERS with 2 or more years experience in:	• Inertial Guidance Systems • Gyro Development • Military Specifications • Servo-mechanisms • Product Design and Packaging of Electro-Mechanical Devices • Fire Control Systems	• Inertial Guidance Systems • Gyro Development • Military Specifications • Servo-mechanisms • Product Design and Packaging of Electro-Mechanical Devices
NUCLEAR ENGINEERS AND PHYSICISTS with experience in:	**NUCLEAR REACTORS** • Control • Metallurgy • Physics • Instrumentation	

Do you dare tackle tough problems? At Ford Instrument Co., finding the answer to problems is the engineer's prime responsibility. As a result, the engineer who meets this challenge receives the professional and financial rewards his work merits. Our qualifications are high, and we want to be sure you can match the high standards of our present engineering staff. Our projects are too important and too complicated to trust to most engineers. What will you do at FICo? That depends on your specific abilities and experience. For details about the challenge, environment, and opportunity at FICo, write Philip F. McCaffrey at below address.

FORD INSTRUMENT CO.
DIVISION OF SPERRY RAND CORPORATION
31-10 Thomson Avenue • Long Island City 1, N.Y.

NEW PRODUCTS

New Dummy Load

A new high-power, L-band, Dummy Load with direct indicating calorimetric wattmeter, is now in production at WacLine, Inc., 35 So. St. Clair Street, Dayton, Ohio.

The lightweight element of the dummy load is composed of two tapered fluid elements of molded fiberglass construction which are centered inside of a four foot long section of aluminum waveguide. A remote heat-exchanger unit pumps a constant volume of glossy liquid through the tapered fiberglass elements. The glossy liquid absorbs the microwave energy, and the heat is then dissipated by the heat-exchanger unit. The differential liquid temperature between input and output flow connections to the load element is measured by a thermopile element, and a remote meter reads directly the kilowatts of energy absorbed.

The unit operates in a frequency range from 1150 megacycles to 1750 megacycles with a voltage standing wave ratio of less than 1.15 and is rated at 1500 watts maximum average power and 5 megawatts peak pulse power.

Cementable Teflon Tapes

A complete new line of cementable, glass-supported and unsupported Teflon tapes has been announced by Continental-Diamond Fibre Corp., Newark, Delaware. This miracle material, which has a low coefficient of friction, a non-sticking, corrosion-resistance, and excellent electrical properties, has also been found to be cementable to virtually any type of surface.

Having special value in the electrical and electronic fields, applications include coil, motor winding and electronic chassis insulation, and surface facing on other insulating materials. The glass-supported material differs from the unsupported tape in that it is reinforced with finely-woven strong glass cloth, giving it much greater abrasive resistance, higher tensile strength, lower cold flow, improved dimensional stability, and generally superior mechanical properties.

Navigation Automatic

Expected to change fundamentally field army flight operations in the future is the newly developed automatic navigator designed by the Ryan Aeronautical Company, San Diego, Calif. This self-contained electronic automaton enabled a pilot to fly on course for a distance over several cities enroute without depending in any way on ground navigational aids.

Information provided by the automatic navigator consisted of exact location, course yet to fly, and distance already flown.

Plastic TV Screens

Plastic television screens are being produced by G. Felsenthal & Sons, Inc., of Chicago, Ill., which it claims are implosion-proof. When television tubes break and their vacuum creates inward pressures opposite in direction to explosion, it is called implosion. There is a danger created when parts of a tube bounce forward after the implosion.

The new plastic screen is said to be able to withstand inward suction and to keep usual flying pieces safely confined. According to Felsenthal, the screens, which are manufactured on half the weight of glass, soon will be available for sets in various sizes.

HOW TO GET LICENSED *Technicians*

for 2 way radio...microwave...

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Power Transient Analyzer

Introduced by American Machine & Foundry Company of New York City is a compact, portable, power transient analyzer that simultaneously measures, displays and records generator output voltage, frequency, waveform and power. This highly dependable precision instrument called the "TA-120" directly provides information that previously required several pieces of equipment.

Voltage, frequency and KVA are simultaneously measured under both steady state and transient conditions. Their ranges are selected with calibrated, front-panel dials. A string galvanometer oscillograph is supplied with each analyzer.

Any one of four nominal voltages can be selected. A special channel is included to record the voltage waveform on the string galvanometer. Voltage and frequency error is less than 0.1% and less than 1% for a constant phase to neutral voltage KVA output.

Time Saving Connector and Plug Holder

Macdonald and Co., of Glendale, Calif., has announced a "Jiffy 157" Connector and Plug Holder for cutting down time required to make connections to electronic and electrical plugs. Holding any size Cannon or Amphenol Connector or Plug, it has the advantage of being adjustable to the operator's most convenient position for easy soldering or assembly.

The "Jiffy" holder is strong, durable and safe with an all steel case and parts, and a baked enamel finish. It measures 3¾" in width, 4" in height, and 4" in depth.

Mechanical Vibration Measured

Epic Inc. of New York City has developed a convenient method to measure mechanical vibration with its Hand Vibrograph. The vibrations can be detected in aircraft, ships, and vehicles, in machinery and its casings or bases, or in component parts such as charts or springs. More elaborate measurements are available with the aid of accessory equipment.

By mere contact with the feeler tube the instrument is able to sense the vibration. Records are inscribed on moving waxed tape and can be evaluated immediately. No power line is necessary because a flashlight battery serves for the time markers.

New Literature

Containers for Aviation and Electronics

Craig Systems, Inc. of Danvers, Mass., has issued a new brochure illustrating and describing many types of reusable cases and containers for the aviation and electronic industries. They have passed such tests as submersion, splash, drop, impact, pressure, and vibration.

These cases are designed to protect vital cargo such as guided missiles, missile components, electronic equipment, and airplane parts during transit and storage.

Also included in this brochure are descriptions and illustrations of allied equipment such as spare parts cabinets, operator consoles, and general purpose electronic equipment racks.

Photoconductors for Detection and Guidance

Infrared-sensitive lead sulfide photoconductors for detection and guidance systems are described in a new bulletin offered by Electronic Corporation of America. Charts for cell response as a function of both wavelength and source temperature are included with technical specifications and ordering information for four general cell types.

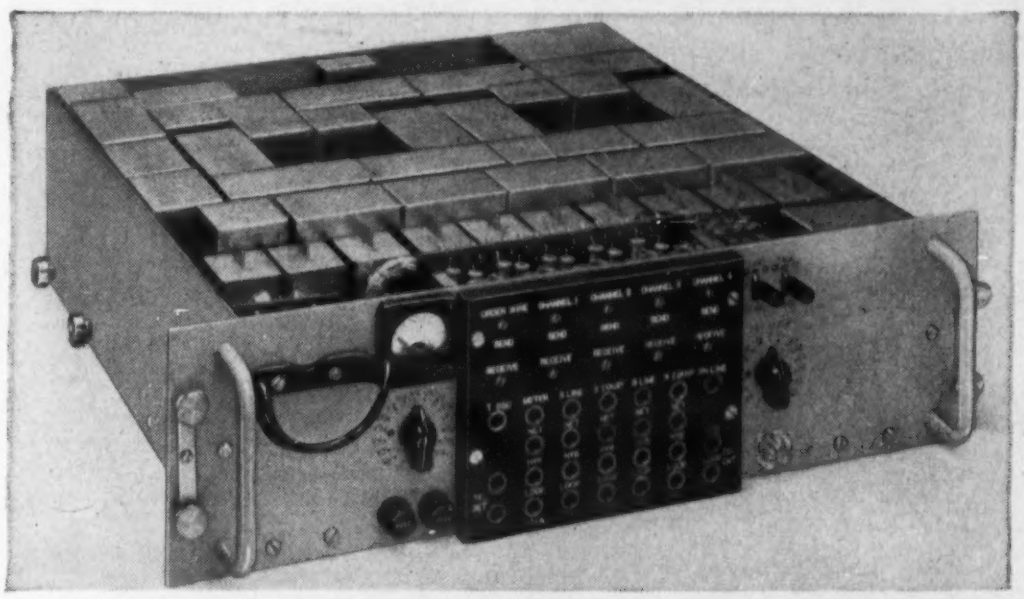
Applications of lead sulfide photoconductors are found in fire control, missile guidance, aerial mapping, data reduction and spectropsy.

Copies of the bulletin may be obtained by writing to Electronics Corporation of America, Photoconductor-Transistor Division, 1 Memorial Drive, Cambridge, Mass.

Selenium Rectifier Replacement Guide

A 52-page Replacement Guide with detailed information on selenium rectifier replacements for servicing literally hundreds of different TV and radio receiver chassis and a variety of other electronic products has been compiled by the Components Division of Federal Telephone and Telegraph Corp. of Clifton, N. J.

This guide also contains trouble shooting, servicing, and testing information on selenium rectifiers, and provides information on the rectifiers in tabular and diagrammatic form. Other sections of the Guide present electrical characteristics of the rectifiers with photos and a cross reference table for replacement of rectifiers of other manufacturers.



FOUR-CHANNEL CARRIER-TELEPHONE TERMINAL FOR RADIO LINKS

This is a miniaturized unit of advanced design which provides four voice channels on a frequency-division basis above a voice-frequency order-wire channel. Each of these five channels is provided with a 4-wire 2-wire termination and a voice-frequency ringing circuit for d-c or 20-cycle signals. Adjustable attenuators are provided in the 4-wire side of all channels, and a built-in test oscillator and meter permit complete line-up, maintenance and trouble-shooting checks to be made. Channel levels are from –9 to 0 dbm and line levels from –30 to 0 dbm. Channel width is 300 to 3500 cycles within 1 db.

This unit is only 5¼" high by 19" wide by 14" deep. It mounts on a standard rack and operates from 115 volts 50-60 cycles a.c.

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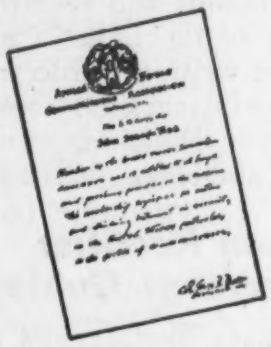

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